12 CHAPTER

GEOMETRY & CO-ORDINATE

EXERCISE

YEAR : 2004

1. Bhuvnesh has drawn an angle of measure 45°27' when he was asked to draw an angle of 45°. The percentage error in his drawing is
(a) 0.5% (b) 1.0%
(c) 1.5% (d) 2.0%

YEAR : 2006

2. In a regular polygon, the exterior and interior angles are in the ratio 1 : 4. The number of sides of the polygon is
(a) 5 (b) 10
(c) 3 (d) 8

YEAR : 2007

3. The sides of a triangle are in the ratio 3 : 4 : 6. The triangle is :
(a) acute -angled
(b) right- angled
(c) obtuse- angled
(d) either acute- angled or right-angled

YEAR : 2008

4. If the length of the three sides of a triangle are 6 cm, 8 cm and 10 cm, then the length of the median to its greatest side is
(a) 8 cm (b) 6 cm
(c) 5 cm (d) 4.8 cm

YEAR : 2011

5. If the circumradius of an equilateral triangle be 10 cm, then the measure of its in-radius is
(a) 5 cm (b) 10 cm
(c) 20 cm (d) 15 cm

6. O and C are respectively the orthocentre and the circumcentre of an acute-angled triangle PQR. The points P and O are joined and produced to meet the side QR at S. If $\angle PQS = 60°$ and $\angle QCR = 130°$, then $\angle RPS =$
(a) 30° (b) 35°
(c) 100° (d) 60°

7. In ΔABC, AD is the internal bisector of $\angle A$, meeting the side BC at D. If BD = 5 cm, BC = 7.5 cm, then AB : AC is
(a) 2 : 1 (b) 1 : 2
(c) 4 : 5 (d) 3 : 5

8. I is the incentre of ΔABC, $\angle ABC = 60°$ and $\angle ACB = 50°$. Then $\angle BIC$ is
(a) 55° (b) 125°
(c) 70° (d) 65°

9. The in-radius of an equilateral triangle is of length 3 cm. Then the length of each of its medians is
(a) 12 cm (b) $\frac{9}{2}$ cm
(c) 4 cm (d) 9 cm

10. Two medians AD and BE of ΔABC intersect G at right angle. If AD = 9 cm and BE = 6 cm, then the length of BD (in cm) is
(a) 10 (b) 6
(c) 5 (d) 3

11. The difference between the interior and exterior angles at a vertex of a regular polygon is 150°. The number of sides of the polygon is
(a) 10 (b) 15
(c) 24 (d) 30

12. Each interior angle of a regular polygon is 144°. The number of sides of the polygon is
(a) 8 (b) 9
(c) 10 (d) 11

13. If the sum of the interior angles of a regular polygon be 1080°, the number of sides of the polygon is
(a) 6 (b) 8
(c) 10 (d) 12

14. The number of sides in two regular polygons are in the ratio of 5 : 4. The difference between their Interior angles of the polygon is 6°. Then the number of sides are
(a) 15, 12 (b) 5, 4
(c) 10, 8 (d) 20 , 16

15. Each internal angle of regular polygon is two times its external angle. Then the number of sides of the polygon is :
(a) 8 (b) 6
(c) 5 (d) 7

16. Ratio of the number of sides of two regular polygons is 5 : 6 and the ratio of their each interior angle is 24 : 25. Then the number of sides of these two polygons are
(a) 10,12 (b) 20,24
(c) 15,18 (d) 35,42

17. Measure of each interior angle of a regular polygon can never be :
(a) 150° (b) 105°
(c) 108° (d) 144°

18. The length of the diagonal BD of the parallelogram ABCD is 18 cm. If P and Q are the centroid of the ΔABC and ΔADC respec-tively then the length of the line segment PQ is
(a) 4 cm (b) 6 cm
(c) 9 cm (d) 12 cm

19. The side AB of a parallelogram ABCD is produced to E in such way that BE = AB, DE intersects BC at Q. The point Q divides BC in the ratio
(a) 1 : 2 (b) 1 : 1
(c) 2 : 3 (d) 2 : 1

20. ABCD is a cyclic trapezium such that $AD \parallel BC$, if $\angle ABC = 70°$, then the value of $\angle BCD$ is :
(a) 60° (b) 70°
(c) 40° (d) 80°

21. ABCD is a cyclic trapezium whose sides AD and BC are parallel to each other. If $\angle ABC$ = 72°, then the measure of the $\angle BCD$ is
(a) 162° (b) 18°
(c) 108° (d) 72°

22. If an exterior angle of a cyclic quadrilateral be 50°, then the interior opposite angle is :
(a) 130° (b) 40° (c) 50° (d) 90°

23. ABCD is a rhombus. A straight line through C cuts AD produced at P and AB produced at Q. If DP = $\frac{1}{2}$ AB, then the ratio of the length of BQ and AB is
(a) 2:1 (b) 1:2
(c) 1:1 (d) 3:1

24. In a quadrilateral ABCD, with unequal sides if the diagonals AC and BD intersect at right angles then
(a) $AB^2 + BC^2 = CD^2 + DA^2$
(b) $AB^2 + CD^2 = BC^2 + DA^2$
(c) $AB^2 + AD^2 = BC^2 + CD^2$
(d) $AB^2 + BC^2 = 2(CD^2 + DA^2)$

25. The ratio of the angles $\angle A$ and $\angle B$ of a non-square rhombus ABCD is 4 : 5, then the value of $\angle C$ is :
(a) 50° (b) 45°
(c) 80° (d) 95°

26. ABCD is a rhombus whose side AB = 4 cm and $\angle ABC = 120°$, then the length of diagonal BD is equal to:
(a) 1 cm (b) 2 cm
(c) 3 cm (d) 4 cm

27. The length of a chord of a circle is equal to the radius of the circle. The angle which this chord subtends in the major segment of the circle is equal to
(a) 30° (b) 45°
(c) 60° (d) 90°

28. AB = 8 cm and CD = 6 cm are two parallel chords on the same side of the centre of a circle. The distance between them is 1 cm. The radius of the circle is
(a) 5 cm (b) 4 cm
(c) 3 cm (d) 2 cm

29. The length of two chords AB and AC of a circle are 8 cm and 6 cm and $\angle BAC$ = 90°, then the radius of circle is
(a) 25 cm (b) 20 cm
(c) 4 cm (d) 5 cm

30. The distance between two parallel chords of length 8 cm each in a circle of diameter 10 cm is
(a) 6 cm (b) 7cm
(c) 8 cm (d) 5.5 cm

31. The radius of two concentric circles are 9 cm and 15 cm. If the chord of the greater circle be a tangent to the smaller circle, then the length of that chord is
(a) 24 cm (b) 12 cm
(c) 30 cm (d) 18 cm

32. If chord of a circle of radius 5 cm is a tangent to another circle of radius 3 cm, both the circles being concentric, then the length of the chord is
(a) 10 cm (b) 12.5 cm
(c) 8 cm (d) 7 cm

33. The two tangents are drawn at the extermities of diameter AB of a circle with centre P. If a tangent to the circle at the point C intersects the other two tangents at Q and R, then the measure of the $\angle QPR$ is
(a) 45° (b) 60°
(c) 90° (d) 180°

34. AB is a chord to a circle and PAT is the tangent to the circle at A. If $\angle BAT$ = 75° and $\angle BAC$ = 45° and C being a point on the circle, then $\angle ABC$ is equal to
(a) 40° (b) 45°
(c) 60° (d) 70°

35. The tangents at two points A and B on the circle with centre O intersects at P. If in quadrilateral PAOB, $\angle AOB : \angle APB = 5 : 1$, then measure of $\angle APB$ is :
(a) 30° (b) 60°
(c) 45° (d) 15°

36. Two circles touch each other externally at point A and PQ is a direct common tangent which touches the circles at P and Q respectively. Then $\angle PAQ$ =
(a) 45° (b) 90°
(c) 80° (d) 100°

37. PR is tangent to a circle, with centre O and radius 4 cm, at point Q. If $\angle POR = 90°$, OR= 5 cm and OP = $\frac{20}{3}$ cm, then (in cm) the length of PR is :
(a) 3 (b) $\frac{16}{3}$
(c) $\frac{23}{3}$ (d) $\frac{25}{3}$

38. Two chords AB and CD of circle whose centre is O, meet at the point P and $\angle AOC$ = 50°, $\angle BOD = 40°$, Then the value of $\angle BPD$ is
(a) 60° (b) 40°
(c) 45° (d) 75°

39. A straight line parallel to BC of $\triangle ABC$ intersects AB and AC at points P and Q respectively. AP = QC, PB =4 units and AQ = 9 units, then the length of AP is :
(a) 25 units (b) 3 units
(c) 6 units (d) 6.5 units

40. The circumcentre of a triangle ABC is O. If $\angle BAC$ = 85° and $\angle BCA$ = 75°, then the value of $\angle OAC$ is
(a) 40° (b) 60°
(c) 70° (d) 90°

41. O is the incentre of $\triangle ABC$ and $\angle A$ = 30°, then $\angle BOC$ is
(a) 100° (b) 105°
(c) 110° (d) 90°

42. Let O be the in-centre of a triangle ABC and D be a point on the side BC of ΔABC , such that $OD \perp BC$. If $\angle BOD$ = 15°, then $\angle ABC$ =
(a) 75° (b) 45°
(c) 150° (d) 90°

43. In a triangle ABC, incentre is O and $\angle BOC$ = 110°, then the measure of $\angle BAC$ is :
(a) 20° (b) 40°
(c) 55° (d) 110°

44. The points D and E are taken on the sides AB and AC of ΔABC such that AD = $\frac{1}{3}$ AB, AE = $\frac{1}{3}$ AC. If the length of BC is 15 cm, then the length of DE is :
(a) 10 cm (b) 8 cm
(c) 6 cm (d) 5 cm

45. D is any point on side AC of ΔABC . If P, Q, X , Y are the mid-point of AB, BC, AD and DC respectively, then the ratio of PX and QY is
(a) 1 : 2 (b) 1 : 1
(c) 2 : 1 (d) 2 : 3

Year : 2012

46. If the orthocentre and the centroid of a triangle are the same, then the triangle is;
(a) Scalene
(b) Right angled
(c) Equilateral
(d) Obtuse angled

47. If in a triangle, the orthocentre lies on vertex, then the traingle is
(a) Acute angled (b) Isosceles
(c) Right angled (d) Equilateral

48. If the incentre of an equilateral triangle lies inside the triangle and its radius is 3 cm, then the side of the equilateral triangle is
(a) $9\sqrt{3}$ cm (b) $6\sqrt{3}$ cm
(c) $3\sqrt{3}$ cm (d) 6 cm

49. If ΔABC is an isosceles triangle with $\angle C = 90°$ and AC = 5 cm then AB is :
(a) 5 cm (b) 10 cm
(c) $5\sqrt{2}$ cm (d) 2.5 cm

50. If the circumcentre of a triangle lies outside it, then the triangle is
(a) Equilateral
(b) Acute angled
(c) Right angled
(d) Obtuse angled

51. I is the incentre of a triangle ABC. If $\angle ACB$ = 55°, $\angle ABC$ = 65° then the value of $\angle BIC$ is
(a) 130° (b) 120°
(c) 140° (d) 110°

52. In ΔABC , $\angle BAC$ = 90° and $AB = \frac{1}{2}$ BC, Then the measure of $\angle ACB$ is :
(a) 60° (b) 30° (c) 45° (d) 15°

53. The length of the three sides of a right angled triangle are $(x - 2)$cm, (x) cm and $(x + 2)$ cm respectively. Then the value of x is
(a) 10 (b) 8 (c) 4 (d) 0

54. ΔABC be a right-angled triangle where $\angle A = 90°$ and $AD \perp BC$. If ar (ΔABC)= 40 cm², ar (ΔACD) = 10 cm² and AC = 9 cm,then the length of BC is
(a) 12 cm (b) 18 cm
(c) 4 cm (d) 6 cm

55. In a triangle ABC, $\angle BAC = 90°$ and AD is perpendicular to BC. If AD = 6 cm and BD = 4 cm then the length of BC is :
(a) 8 cm (b) 10 cm
(c) 9 cm (d) 13 cm

56. In a right angled ΔABC , $\angle ABC$ = 90°, AB = 3, BC = 4, CA = 5; BN is perpendicular to AC, AN : NC is
(a) 3 : 4 (b) 9 : 16
(c) 3 : 16 (d) 1 : 4

57. For a triangle base is $6\sqrt{3}$ cm and two base angles are 30° and 60°. Then height of the triangle is
(a) $3\sqrt{3}$ cm (b) 4.5 cm
(c) $4\sqrt{3}.$ cm (d) $2\sqrt{3}$ cm

58. ABC is a right angled triangled, right angled at C and p is the length of the perpendicular from C on AB. If a, b and c are the length of the sides BC, CA and AB respectively , then
(a) $\frac{1}{p^2} = \frac{1}{b^2} - \frac{1}{a^2}$
(b) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$
(c) $\frac{1}{p^2} + \frac{1}{a^2} = -\frac{1}{b^2}$
(d) $\frac{1}{p^2} = \frac{1}{a^2} - \frac{1}{b^2}$

59. The orthocentre of a right angled triangle lies
(a) outside the triangle
(b) at the right angular vertex
(c) on its hypotenuse
(d) within the triangle

60. Each interior angle of a regular polygon is three times of its exterior angle, then the number of sides of the regular polygon is:
(a) 9 (b) 8
(c) 10 (d) 7

61. The sum of all interior angles of a regular polygon is twice the sum of all its exterior angles. The number of sides of the polygon is
(a) 10 (b) 8
(c) 12 (d) 6

62. The ratio between the number of sides of two regular polygons is 1 : 2 and the ratio between there interior angles is 2 : 3. The number of sides of these polygons is respectively
(a) 6, 12 (b) 5 ,10
(c) 4, 8 (d) 7, 14

63. ABCD is a cyclic paralle-logram.The angle $\angle B$ is equal to :
(a) 30° (b) 60°
(c) 45° (d) 90°

64. ABCD is a cyclic quadrilateral and O is the centre of the circle. If $\angle COD$ = 140° and $\angle BAC$ = 40°, then the value of $\angle BCD$ is equal to
(a) 70° (b) 90°
(c) 60° (d) 80°

65. ABCD is a trapezium whose side AD is parallel to BC, Diagonals AC and BD intersect at O. If AO = 3, CO = x –3, BO = $3x$ –19 and DO = x – 5, the value(s) of x will be :
(a) 7, 6 (b) 12, 6
(c) 7, 10 (d) 8, 9

66. Two equal circles of radius 4 cm intersect each other such that each passes through the centre of the other. The length of the common chord is

(a) $2\sqrt{3}$ cm (b) $4\sqrt{3}$ cm

(c) $2\sqrt{2}$ cm (d) 8 cm

67. One chord of a circle is known to be 10.1 cm. The radius of this circle must be:

(a) 5 cm

(b) greater than 5 cm

(c) greater than or equal to 5 cm

(d) less than 5 cm

68. The length of the chord of a circle is 8 cm and perpen-dicular distance between centre and the chord is 3 cm. Then the radius of the circle is equal to :

(a) 4 cm (b) 5 cm

(c) 6 cm (d) 8 cm

69. The length of the common chord of two intersecting circles is 24 cm. If the diameter of the circles are 30 cm and 26 cm, then the distance between the centre (in cm) is

(a) 13 (b) 14 (c) 15 (d) 16

70. In a circle of radius 21 cm and arc subtends an angle of 72° at the centre. The length of the arc is

(a) 21.6 cm (b) 26.4 cm

(d) 13.2 cm (d) 198.8 cm

71. A unique circle can always be drawn through x number of given non-collinear points, then x must be

(a) 2 (b) 3 (c) 4 (d) 1

72. Two parallel chords are drawn in a circle of diameter 30 cm. The length of one chord is 24 cm and the distance between the two chords is 21 cm. The length of the other chord is

(a) 10 cm (b) 18 cm

(c) 12 cm (d) 16 cm

73. If two equal circles whose centres are O and O$'$ intersect each other at the point A and B , OO$'$ = 12 cm and AB = 16 cm, then the radius of the circle is

(a) 10 cm (b) 8 cm

(c) 12 cm (d) 14 cm

74. Chords AB and CD of a circle intersect externally at P. If AB = 6 cm, CD= 3 cm and PD = 5 cm, then the length of PB is

(a) 5 cm (b) 7.35 cm

(c) 6 cm (d) 4 cm

75. Two circles touch each other externally at P. AB is a direct common tangent to the two circles, A and B are point of contact and $\angle PAB$ = 35°. Then $\angle ABP$ is

(a) 35° (b) 55° (c) 65° (d) 75°

76. If the radii of two circles be 6 cm and 3 cm and the length the transverse common tangent be 8 cm, then the distance between the two centres is

(a) $\sqrt{145}$ cm (b) $\sqrt{140}$ cm

(c) $\sqrt{150}$ cm (d) $\sqrt{135}$ cm

77. The distance between the centre of two equal circles each of radius 3 cm, is 10 cm. The length of a transverse common tangent is

(a) 8 cm (b) 10 cm

(c) 4 cm (d) 6 cm

78. AC is the diameter of a circumcircle of ΔABC. Chord ED is parallel to the diameter AC. If $\angle CBE$ = 50°, then the measure of $\angle DEC$ is

(a) 50° (b) 90° (c) 60° (d) 40°

79. The length of the two sides forming the right angle of a right-angled triangle are 6 cm and 8 cm. The length of its circum-radius is:

(a) 5 cm (b) 7 cm

(c) 6 cm (d) 10 cm

80. P and Q are centre of two circles with radii 9 cm and 2 cm respectively, where PQ =17 cm. R is the centre of another circle of radius x cm, which touches each of the above two circles externally. If $\angle PRQ = 90°$, then the value of x is

(a) 4 cm (b) 6 cm

(c) 7 cm (d) 8 cm

81. Two line segments PQ and RS intersect at X in such a way that XP = XR. If $\angle PSX = \angle RQX$, then one must have

(a) PR = QS

(b) PS = RQ

(c) $\angle XSQ = \angle XRP$

(d) $ar(\Delta PXR) = ar(\Delta QXS)$

82. In a ΔABC, $AB^2 + AC^2 = BC^2$ and BC = $\sqrt{2}AB$, then $\angle ABC$ is:

(a) 30° (b) 45°

(c) 60° (d) 90°

83. Two chords AB and CD of a circle with centre O intersect each other at the point P. If $\angle AOD$ = 20° and $\angle BOC$ = 30°, then $\angle BPC$ is equal to:

(a) 50° (b) 20°

(c) 25° (d) 30°

84. ABCD is a quadrilateral inscribed in a circle with centre O. If $\angle COD$ = 120° and $\angle BAC$ = 30°, then $\angle BCD$ is :

(a) 75° (b) 90°

(c) 120° (d) 60°

85. In ΔABC, $\angle B = 60°$ and $\angle C = 40°$. If AD and AE be respectively the internal bisector of $\angle A$ and perpen-dicular on BC, then the measure of $\angle DAE$ is

(a) 5° (b) 10° (c) 40° (d) 60°

86. The angle between the external bisectors of two angles of a triangle is 60°. Then the third angle of the triangle is

(a) 40° (b) 50° (c) 60° (d) 80°

87. I is the incentre of ΔABC, If $\angle ABC = 60°$, $\angle BCA = 80°$, then the $\angle BIC$ is

(a) 90° (b) 100° (c) 110° (d) 120°

88. In ΔABC, draw $BE \perp AC$ and $CF \perp AB$ and the perpendicular BE and CF intersect at the point O. If $\angle BAC$ = 70°, then the value of $\angle BOC$ is

(a) 125° (b) 55° (c) 150° (d) 110°

89. O is the centre and arc ABC subtends an angle of 130° at O. AB is extended to P, then $\angle PBC$ is

(a) 75° (b) 70° (c) 65° (d) 80°

90. In triangle PQR, points A, B and C are taken on PQ, PR and QR respectively such that QC= AC and CR = CB. If $\angle QPR = 40°$, then $\angle ACB$ is equal to :

(a) 140° (b) 40° (c) 70° (d) 100°

91. AD is the median of a triangle ABC and O is the centroid such that AO = 10 cm. The length of OD (in cm) is
(a) 4 (b) 5 (c) 6 (d) 8

92. The equidistant point from the vertices of a triangle is called its:
(a) Centroid
(b) Incentre
(c) Circumcentre
(d) Orthocentre

93. In a triangle ABC, AB + BC = 12 cm, BC + CA =14 cm and CA+AB= 18 cm. Find the radius of the circle (in cm) which has the same perimeter as the triangle
(a) $\frac{5}{2}$ (b) $\frac{7}{2}$
(c) $\frac{9}{2}$ (d) $\frac{11}{2}$

94. In $\triangle ABC$, D and E are points on AB and AC respectively such that $DE \parallel BC$ and DE divides the $\triangle ABC$ into two parts of equal areas. Then ratio of AD and BD is
(a) 1 : 1 (b) $1 : \sqrt{2} - 1$
(c) $1 : \sqrt{2}$ (d) $1 : \sqrt{2} + 1$

YEAR 2013

95. In a triangle, if three altitudes are equal, then the triangle is
(a) obtuse (b) Equilateral
(c) Right (d) Isosceles

96. If ABC is an equilateral triangle and D is a point on BC such that $AD \perp BC$, then
(a) AB : BD = 1 : 1
(b) AB : BD = 1 : 2
(c) AB : BD = 2 : 1
(d) AB : BD = 3 : 2

97. The side QR of an equilateral triangle PQR is produced to the point S in such a way that QR = RS and P is joined to S. Then the measure of $\angle PSR$ is
(a) 30° (b) 15° (c) 60° (d) 45°

98. Let ABC be an equilateral traingle and AX, BY, CZ be the altitudes. Then the right statement out of the four given responses is
(a) AX = BY = CZ
(b) $AX \neq BY = CZ$
(c) $AX = BY \neq CZ$
(d) $AX \neq BY \neq CZ$

99. ABC is an isosceles triangle such that AB = AC and $\angle B = 35°$, AD is the median to the base BC. Then $\angle BAD$ is
(a) 70° (b) 35°
(c) 110° (d) 55°

100. ABC is an isosceles triangle with AB = AC , A circle through B touching AC at the middle point intersects AB at P. Then AP : AB is:
(a) 4 : 1 (b) 2 : 3
(c) 3 : 5 (d) 1 : 4

101. In an isosceles triangle, if the unequal angle is twice the sum of the equal angles, then each equal angle is
(a) 120° (b) 60°
(c) 30° (d) 90°

102. $\triangle ABC$ is an isosceles triangle and $\overline{AB} = \overline{AC} = 2a$ unit, $\overline{BC}$ = a unit. Draw $\overline{AD} \perp \overline{BC}$, and find the length of $\overline{AD}$.
(a) $\sqrt{15}\ a$ unit (b) $\frac{\sqrt{15}}{2}\ a$ unit
(c) $\sqrt{17}\ a$ unit (d) $\frac{\sqrt{17}}{2}\ a$ unit

103. An isosceles triangle ABC is right-angled at B.D is a point inside the triangle ABC. P and Q are the feet of the perpendiculars drawn from D on the side AB and AC respectively of $\triangle ABC$. If AP = a cm , AQ = b cm and $\angle BAD = 15°$, sin 75° =
(a) $\frac{2b}{\sqrt{3}a}$ (b) $\frac{a}{2b}$
(c) $\frac{\sqrt{3}a}{2b}$ (d) $\frac{2a}{\sqrt{3}b}$

104. ABC is an isosceles triangle with AB = AC. The side BA is produced to D such that AB = AD. If $\angle ABC$ = 30°, then $\angle BCD$ is equal to
(a) 45° (b) 90° (c) 30° (d) 60°

105. In a triangle ABC, AB = AC, $\angle BAC$ = 40° then the external angle at B is :
(a) 90° (b) 70°
(c) 110° (d) 80°

106. Taking any three of the line segments out of segments of length 2 cm, 3 cm, 5 cm and 6 cm, the number of triangles that can be formed is :
(a) 3 (b) 2 (c) 1 (d) 4

107. If the length of the sides of a triangle are in the ratio 4 : 5 : 6 and the inradius of the triangle is 3 cm, then the altitude of the triangle corresponding to the largest side as base is :
(a) 7.5 cm (b) 6 cm
(c) 10 cm (d) 8 cm

108. ABC is a triangle. The bisectors of the internal angle $\angle B$ and external angle $\angle C$ intersect at D. If $\angle BDC$ = 50°, then $\angle A$ is
(a) 100° (b) 90°
(c) 120° (d) 60°

109. In a triangle ABC, the side BC is extended up to D such that CD = AC. If $\angle BAD$ = 109° and $\angle ACB$ = 72° then the value of $\angle ABC$ is
(a) 35° (b) 60° (c) 40° (d) 45°

110. The sum of three altitudes of a triangle is
(a) equal to the sum of three sides
(b) less than the sum of sides
(c) greater than the sum of sides
(d) twice the sum of sides

111. In $\triangle ABC$ $\angle A = 90°$ and $AD \perp BC$ where D lies on BC. If BC = 8 cm , AD = 6 cm , then ar $\triangle ABC$: ar $\triangle ACD$ = ?
(a) 4 : 3 (b) 25 : 16
(c) 16 : 9 (d) 25 : 9

112. If the median drawn on the base of a triangle is half of its base the triangle will be
(a) right-angled
(b) acute-angled
(c) obtuse-angled
(d) equilateral

113. In a right-angle $\triangle ABC$, $\angle ABC$ = 90°, AB = 5 cm and BC = 12 cm. The radius of the circumcircle of the triangle ABC is
(a) 7.5 cm (b) 6 cm
(c) 6.5 cm (d) 7 cm

114. In a right-angled triangle, the product of two sides is equal to half of the square of the third side i.e., hypotenuse. One of the acute angle must be

(a) 60° (b) 30° (c) 45° (d) 15°

115. A point D is taken on the side BC of a right-angled triangle ABC, where AB is hypotenuse. Then

(a) $AB^2 + CD^2 = BC^2 + AD^2$

(b) $CD^2 + BD^2 = 2AD^2$

(c) $AB^2 + AC^2 = 2AD^2$

(d) $AB^2 = AD^2 + BC^2$

116. D and E are two points on the sides AC and BC respectively of ΔABC such that DE = 18 cm, CE = 5 cm and $\angle DEC$ = 90°. If tan $\angle ABC$ = 3.6, then AC : CD =

(a) BC : 2 CE (b) 2CE : BC

(c) 2BC : CE (d) CE : 2BC

117. BL and CM are medians of ΔABC right- angled at A and BC = 5 cm. If BL = $\frac{3\sqrt{5}}{2}$ cm, then the length of CM is

(a) $2\sqrt{5}$ cm (b) $5\sqrt{2}$ cm

(c) $10\sqrt{2}$ cm (d) $4\sqrt{5}$ cm

118. In ΔABC and ΔDEF, AB = DE and BC = EF, then one can infer that $\Delta ABC \cong \Delta DEF$, when

(a) $\angle BAC = \angle EFD$

(b) $\angle ACB = \angle EDF$

(c) $\angle ABC = 2\angle DEF$

(d) $\angle ABC = \angle DEF$

119. Q is a point in the interior of a rectangle ABCD, if QA = 3 cm, QB = 4 cm and QC = 5 cm then the length of QD (in cm) is

(a) $3\sqrt{2}$ (b) $5\sqrt{2}$

(c) $\sqrt{34}$ (d) $\sqrt{41}$

120. ABCD is a rectangle where the ratio of the length of AB and BC is 3 : 2 . If P is the mid- point of AB, then the value of sin $\angle CPB$ is

(a) $\frac{3}{5}$ (b) $\frac{2}{5}$ (c) $\frac{3}{4}$ (d) $\frac{4}{5}$

121. Inside a square ABCD , BEC is an equilateral triangle. If CE and BD intersect at O, then $\angle BOC$ is

(a) 60° (b) 75° (c) 90° (d) 120°

122. The sum of interior angles of a regular polygon is 1440°. The number of sides of the polygon is

(a) 10 (b) 12 (c) 6 (d) 8

123. ABCD is a cyclic trapezium with $AB \parallel DC$ and AB is a diameter of the circle. If $\angle CAB = 30°$, then $\angle ADC$ is

(a) 60° (b) 120°
(c) 150° (d) 30°

124. ABCD is a cyclic quadrilateral. AB and DC are produced to meet at P. If $\angle ADC$ = 70° and $\angle DAB = 60°$, then the $\angle PBC + \angle PCB$ is

(a) 130° (b) 150°
(c) 155° (d) 180°

125. A cyclic quadrilateral ABCD is such that AB = BC , AD = DC, $AC \perp BD$, $\angle CAD = \theta$, then the angle $\angle ABC$ =

(a) θ (b) $\frac{\theta}{2}$ (c) 2θ (d) 3θ

126. The diagonals AC and BD of a cyclic quadrilateral ABCD intersect each other at the point P. Then, it is always true that

(a) BP . AB = CD . CP
(b) AP. CP = BP . DP
(c) AP. BP = CP . DP
(c) AP. CD = AB . CP

127. A quadrilateral ABCD circumscribes a circle and AB = 6 cm, CD = 5 cm and AD = 7 cm. The length of side BC is

(a) 4 cm (b) 5 cm

(c) 3 cm (d) 6 cm

128. In a cyclic quadrilateral ABCD, $\angle A + \angle B + \angle C + \angle D = ?$

(a) 90° (b) 360° (c) 180° (d) 120°

129. AB and CD are two parallel chords of a circle such that AB = 10 cm and CD = 24 cm . If the chords are on the opposite sides of the centre and distance between them is 17 cm, then the radius of the circle is :

(a) 11 cm (b) 12 cm

(c) 13 cm (d) 10 cm

130. A chord AB of a circle C_1 of radius $(\sqrt{3}+1)$ cm touches a circle C_2 which is concentric to C_1. If the radius of C_2 is $(\sqrt{3}-1)$ cm. The length of AB is :

(a) $2\sqrt[4]{3}$ cm (b) $8\sqrt{3}$ cm

(c) $4\sqrt[4]{3}$ cm (d) $4\sqrt{3}$ cm

131. The length of the common chord of two circles of radii 30 cm and 40 cm whose centres are 50 cm apart is (in cm)

(a) 12 (b) 24 (c) 36 (d) 48

132. Chords AB and CD of a circle intersect at E and are perpendicular to each other. Segments AE, EB and ED are of lengths 2 cm, 6 cm and 3 cm respectively. Then the length of the diameter of the circle (in cm) is

(a) $\sqrt{65}$ (b) $\frac{1}{2}\sqrt{65}$

(c) 65 (d) $\frac{65}{2}$

133. Two circles of same radius 5 cm, intersect each other at A and B. If AB = 8 cm, then the distance between the centre is ;

(a) 6 cm (b) 8 cm
(c) 10 cm (d) 4 cm

134. AD is the chord of a circle with centre O and DOC is a line segment orginating from a point D on the circle and intersecting AB produced at C such that BC = OD. If $\angle BCD$ =20°, then $\angle AOD$ = ?

(a) 20° (b) 30° (c) 40° (d) 60°

135. In a circle of radius 17 cm, two parallel chords of length 30 cm and 16 cm are drawn. If both chords are on the same side of the centre. then the distance between the chords is

(a) 9 cm (b) 7 cm
(c) 23 cm (d) 11 cm

136. Two circles touch each other internally. Their radii are 2 cm and 3 cm. The biggest chord of the greater circle which is outside the inner circle is of length

(a) $2\sqrt{2}$ cm (b) $3\sqrt{2}$ cm

(c) $2\sqrt{3}$ cm (d) $4\sqrt{2}$ cm

137. Two circles touch each other externally. The distance between their centre is 7 cm. If the radius of one circle is 4 cm, then the radius of the other circle is

(a) 3.5 cm (b) 3 cm
(c) 4 cm (d) 2 cm

138. A, B and C are the three points on a circle such that the angles subtended by the chords AB and AC at the centre O are 90° and 110° respectively. $\angle BAC$ is equal to

(a) 70° (b) 80° (c) 90° (d) 100°

139. N is the foot of the perpendicular from a point P of a circle with radius 7 cm, on a diameter AB of the circle. If the length of the chord PB is 12 cm , the distance of the point N from the point B is

(a) $6\frac{5}{7}$ cm (b) $12\frac{2}{7}$ cm
(c) $3\frac{5}{7}$ cm (d) $10\frac{2}{7}$ cm

140. A, B, C, D are four points on a circle, AC and BD intersect at a point E such that $\angle BEC$ = 130° and $\angle ECD$ = 20°. $\angle BAC$ is

(a) 120° (b) 90° (c) 100° (d) 110°

141. If two concentric circles are of radii 5 cm and 3 cm, then the length of the chord of the larger circle which touches the smaller circle is:

(a) 6 cm (b) 7 cm
(c) 10 cm (d) 8 cm

142. If the chord of a circle is equal to the radius of the circle, then the angle subtended by the chord on centre is

(a) 150° (b) 60°
(c) 120° (d) 30°

143. P and Q are two points on a circle with centre at O. R is a point on the minor arc of the circle, between the points P and Q. The tangents to the circle at the points P and Q meet each other at the point S. If $\angle PSQ$ = 20°, then $\angle PRQ$ = ?

(a) 80° (b) 200° (c) 160° (d) 100°

144. Two circles intersect at A and B, P is a point on produced BA. PT and PQ are tangents to the circles. The relation of PT and PQ is

(a) PT = 2PQ (b) PT < PQ
(c) PT > PQ (d) PT = PQ

145. The length of the tangent drawn to a circle of radius 4 cm from a point 5 cm away from the centre of the circle is

(a) 3 cm (b) $4\sqrt{2}$ cm
(c) $5\sqrt{2}$ cm (d) $3\sqrt{2}$ cm

146. From a point P, two tangents PA and PB are drawn to a circle with centre O. If OP is equal to diameter of the circle, then $\angle APB$ is

(a) 45° (b) 90° (c) 30° (d) 60°

147. The radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the bigger circle and BD is a tangent to the smaller circle touching it at D and the bigger circle at E. Point A is joined to D. The length of AD is

(a) 20 cm (b) 19 cm
(c) 18 cm (d) 17 cm

148. PQ is a chord of length 8 cm of a circle with centre O and radius 5 cm. The tangents at P and Q intersect at a point T. The length of TP is

(a) $\frac{20}{3}$ cm (b) $\frac{21}{4}$ cm
(c) $\frac{10}{3}$ cm (d) $\frac{15}{4}$ cm

149. The maximum number of common tangents drawn to two circles when both the circles touch each other externally is

(a) 1 (b) 2 (c) 3 (d) 0

150. I and O are respectively the incentre and circumcentre of a triangle ABC. The line AI produced intersects the circumcircle of ΔABC at the point D. If $\angle ABC = x°$, $\angle BID = y°$ and $\angle BOD = z°$, then $\frac{z+x}{y}$ = ?

(a) 3 (b) 1 (c) 2 (d) 4

151. The radius of the circumcircle of a right angled triangle is 15 cm and the radius of its in- circle is 6 cm. Find the sides of the triangle.

(a) 30, 40, 41 (b) 18, 24, 30
(c) 30, 24, 25 (d) 24, 36, 20

152. If the ΔABC is right angled at B, find its circumradius if the sides AB and BC are 15 cm and 20 cm respectively.

(a) 25 cm (b) 20 cm
(c) 15 cm (d) 12.5 cm

153. If the circumradius of an equilateral triangle ABC be 8 cm, then the height of the triangle is

(a) 16 cm (b) 6 cm
(c) 8 cm (d) 12 cm

154. Triangle PQR circumscribes a circle with centre O and radius *r* cm such that $\angle PQR$ = 90°. if PQ= 3 cm , QR = 4 cm, then the value of *r* is ;

(a) 2 (b) 1.5
(c) 2.5 (d) 1

155. The radius of two concentric circles are 17 cm and 10 cm. A straight line ABCD intersects the larger circle at the point A and D and intersects the smaller circle at the points B and C. If BC = 12 cm, then the length of AD (in cm) is

(a) 20 (b) 24 (c) 30 (d) 34

156. P and Q are centre of two circles with radii 9 cm and 2 cm respectively, where PQ =17 cm, R is the centre of another circle of radius x cm, which touches each of the above two circles externally. If $\angle PRQ$ = 90°, then the value of x is

(a) 4 cm (b) 6 cm
(c) 7 cm (d) 8 cm

157. Two chords AB , CD of a circle with centre O intersect each other at P. $\angle ADP$ = 23° and $\angle APC$ = 70°, then the $\angle BCD$ is

(a) 45° (b) 47° (c) 57° (d) 67°

158. In a ΔABC $\angle A : \angle B : \angle C$ = 2 : 3 : 4. A line CD drawn || to AB, then the $\angle ACD$ is :

(a) 40° (b) 60° (c) 80° (d) 20°

159. In triangle ABC, $\angle BAC$ = 75°, $\angle ABC$ = 45°, $\overline{BC}$ is produced to D. If $\angle ACD = x°$, then $\frac{x}{3}$% of 60° is

(a) 30° (b) 48°
(c) 15° (d) 24°

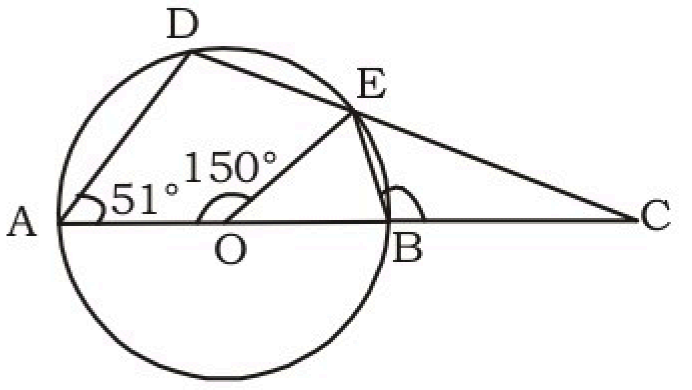
160. In a ΔABC , AB = AC and BA is produced to D such that AC = AD. Then the $\angle BCD$ is
(a) 100° (b) 60° (c) 80° (d) 90°

161. In ΔABC, $\angle A + \angle B = 65°$, $\angle B + \angle C = 140°$, then find $\angle B$.
(a) 40° (b) 25° (c) 35° (d) 20°

162. In a triangle ABC, $\angle A = 90°, \angle C = 55°$, $\overline{AD} \perp \overline{BC}$. what is the value of $\angle BAD$?
(a) 35° (b) 60° (c) 45° (d) 55°

163. If O be the circumcentre of a triangle PQR and $\angle QOR = 110°$, $\angle OPR = 25°$, then the measure of $\angle PRQ$ is
(a) 65° (b) 50° (c) 55° (d) 60°

164. In the following figure, AB is the diameter of a circle whose centre is O. If $\angle AOE = 150°, \angle DAO = 51°$ then the measure of $\angle CBE$ is :



(a) 115° (b) 110° (c) 105° (d) 120°

165. In a triangle ABC , BC is produced to D so that CD = AC. If $\angle BAD = 111°$ and $\angle ACB = 80°$, then the measure of $\angle ABC$ is :
(a) 31° (b) 33° (c) 35° (d) 29°

166. All sides of a quadrilateral ABCD touch a circle, If AB = 6 cm, BC = 7.5 cm, CD = 3 cm, then DA is
(a) 3.5 cm (b) 4.5 cm
(c) 2.5 cm (d) 1.5 cm

167. D is a point on the side BC of a triangle ABC such that $AD \perp BC$, E is a point on AD for which AE : ED = 5 : 1. If $\angle BAD = 30°$ and tan $\angle ACB$ = 6. tan $\angle DBE$, then $\angle ACB$ =
(a) 30° (b) 45° (c) 60° (d) 15°

168. The perpendiculars drawn from the vertices to the opposite sides of a triangle, meet at the point whose name is
(a) incentre (b) circumcentre
(c) centroid (d) orthocentre

169. If in ΔABC, $\angle ABC = 5\ \angle ACB$ and $\angle BAC = 3\ \angle ACB$, then $\angle ABC$ = ?
(a) 130° (b) 80° (c) 100° (d) 120°

170. The exterior angles obtained on producing the base BC of a triangle ABC in both ways are 120°and 105°, then the vertical $\angle A$ of the triangle is
(a) 36° (b) 40°
(c) 45° (d) 55°

171. If AD, BE and CF are medians of ΔABC , then which one of the following statements is correct ?
(a) (AD + BE +CF) <AB + BC + CA
(b) AD + BE +CF > AB + BC + CA
(c) AD + BE + CF = AB + BC + CA
(d) AD +BE + CF = $\sqrt{2}$ (AB+BC+CA)

172. Inside a triangle ABC, a straight line parallel to BC intersects AB and AC at the point P and Q respectively. If AB = 3 PB, then PQ : BC is
(a) 1 : 3 (b) 3 : 4
(c) 1 : 2 (d) 2 : 3

173. In ΔABC, $DE \parallel AC$, D and E are two points on AB and CB respectively. If AB = 10 cm and AD = 4 cm, then BE : CE is
(a) 2 : 3 (b) 2 : 5
(c) 5 : 2 (d) 3 : 2

174. For a triangle ABC, D and E are two points on AB and AC such that AD = $\frac{1}{4}$ AB, AE = $\frac{1}{4}$ AC. If BC = 12 cm, then DE is
(a) 5 cm (b) 4 cm
(c) 3 cm (d) 6 cm

175. If I be the incentre of Δ ABC and $\angle B = 70^0$ and $\angle C = 50^0$, then the magnitude of $\angle$ BIC is
(a) 130^0 (b) 60^0 (c) 120^0 (d) 105^0

176. For a triangle ABC, D, E, F are the mid - points of its sides. if Δ ABC = 24 sq. units then Δ DEF is
(a) 4 sq. units (b) 6 sq. units
(c) 8 sq. units (d) 12 sq. units

177. The angle in a semi-circle is
(a) a reflex angle
(b) an obtuse angle
(c) an acute angle
(d) a right angle

178. Angle between the internal bisectors of two angles of a triangle $\angle B$ and $\angle C$ is120°, then $\angle A$ is
(a) 20° (b) 30° (c) 60° (d) 90°

179. The angles of a triangle are in the ratio 2 : 3 : 7. The measure of the smallest angle is
(a) 30° (b) 60°
(c) 45° (d) 90°

180. In a ΔABC, AB = BC, $\angle B = x°$ and $\angle A = (2x–20)°$, Then $\angle B$ is
(a) 54° (b) 30° (c) 40° (d) 44°

181. If AD is the median of the traingle ABC and G be the centroid, then the ratio of AG : AD is
(a) 1 : 3 (b) 2 : 1
(c) 3 : 2 (d) 2 : 3

182. Two supplementary angles are in the ratio 2 : 3. The angles are
(a) 33°,57° (b) 66°, 114°
(c) 72°, 108° (d) 36°, 54°

183. In a triangle ABC, median is AD and centroid is O, AO = 10 cm. The length of OD (in cm) is
(a) 6 (b) 4 (c) 5 (d) 3.3

YEAR : 2014

184. If ABC is an equilateral triangle and P, Q, R respectively denote the middle points of AB, BC, CA, then
(a) PQR must be an equilateral triangle
(b) PQ+ QR = PqR+AB
(c) PQ+QR = PR+2AB
(d) PQR must be a right angled

185. Let ABC be an equilateral triangle and AX, BY,CZ be the altitude. Then the right statement out of the four given responses is
(a) AX = BY = CZ
(b) $AX \neq BY = CZ$
(c) AX = $BY \neq CZ$
(d) $AX \neq BY \neq CZ$

186. ABC is an equilateral triangle and CD is the internal bisector of $\angle C$. If DC is produced to E such that AC = CE, then $\angle CAE$ is equal to
(a) 45° (b) 75°
(c) 30° (d) 15°

187. G is the centroid of the equilateral ΔABC. If AB = 10 cm then length of AG is

(a) $\frac{5\sqrt{3}}{3}$ cm (b) $\frac{10\sqrt{3}}{3}$ cm

(c) $5\sqrt{3}$ cm (d) $10\sqrt{3}$ cm

188. The radius of the incircle of the equilateral triangle having each side 6 cm is

(a) $2\sqrt{3}$ cm (b) $\sqrt{3}$ cm

(c) $6\sqrt{3}$ cm (d) 2 cm

189. If the three medians of a triangle are same, then the triangle is

(a) equilateral
(b) isosceles
(c) right- angled
(d) obtuse-angle

190. If Δ FGH is isosceles and FG < 3 cm, GH = 8 cm, then of the following the true relation is.

(a) GH = FH (b) GF = GH
(c) FH > GH (d) GH < GF

191. If angle bisector of a triangle bisects the opposite side, then what type of triangle is it?

(a) Right angled
(b) Equilateral
(c) Isosceles or equilateral
(d) Isosceles

192. If two angles of a triangle are 21° and 38°, then the triangle is

(a) Right- angled triangle
(b) Acute- angled triangle
(c) Obtuse-angled triangle
(d) Isosceles triangle

193. In ΔABC, $\angle C$ is an obtuse angle. The bisectors of the exterior angles at A and B meet BC and AC produced at D and E respectively. If AB = AD = BE, then $\angle ACB$ =

(a) 105° (b) 108° (c) 110° (d) 135°

194. A man goes 24 m due west and then 10 m due north. Then the distance of him from the starting point is

(a) 17 m (b) 26 m
(c) 28 m (d) 34 m

195. If the measures of the sides of triangle are (x^2-1), (x^2+1) and 2x cm, then the triangle would be

(a) equilateral
(b) acute - angled
(c) right-angled
(d) isosceles

196. If each angle of a triangle is less than the sum of the other two, then the triangle is

(a) obtuse angled
(b) Acute or equilateral
(c) acute angled
(d) equilateral

197. ABC is a right- angled triangle with AB = 6 cm and BC = 8 cm. A circle with centre O has been inscribed inside ΔABC. The radius of the circle is

(a) 1 cm (b) 2 cm
(c) 3 cm (d) 4 cm

198. If the sides of a right angled triangle are three consecutive integers, then the length of the smallest side is

(a) 3 units (b) 2 units
(c) 4 units (d) 5 units

199. In ΔPQR, S and T are point on sides PR and PQ respectively such that $\angle PQR = \angle PST$, If PT = 5 cm, PS = 3 cm and TQ = 3 cm, then length of SR is

(a) 5 cm (b) 6 cm

(c) $\frac{31}{3}$ cm (d) $\frac{41}{3}$ cm

200. In ΔABC, two points D and E are taken on the lines AB and BC respectvely in such a way that AC is parallel to DE. Then ΔABC and ΔDBE are

(a) similar only If D lies outside the line segment AB
(b) congruent only If D lies out side the line segment AB
(c) always similar
(d) always congruent

201. If the opposite sides of a quadrilateral and also its diagonals are equal, then each of the angles of the quadrilateral is

(a) 90° (b) 120°
(c) 100° (d) 60°

202. Among the angles 30°, 36°, 45°,50° one angle cannot be an exterior angle of a regular polygon. The angle is

(a) 30° (b) 36° (c) 45° (d) 50°

203. An interior angle of a regular polygon is 5 times its exterior angle. Then the number of sides of the polygon is

(a) 14 (b) 16 (c) 12 (d) 18

204. In a regular polygon, if one of its internal angle is greater than the external angle by 132°, then the number of sides of the polygon is

(a) 14 (b) 12 (c) 15 (d) 16

205. If the ratio of an external angle and an internal angle of a regular polygon is 1 : 17, then the number of sides of the regular polygon is

(a) 20 (b) 18 (c) 36 (d) 12

206. ABCD is a cyclic quadrilateral. The side AB is extended to E in such a way that BE = BC, If $\angle ADC = 70°$, $\angle BAD = 95°$, then $\angle DCE$ is equal to

(a) 140° (b) 120° (c) 165° (d) 110°

207. If ABCD be a cyclic quadrilateral in which $\angle A = 4x°$, $\angle B = 7x°$, $\angle C = 5y°$, $\angle D = y°$, then x : y is

(a) 3 : 4 (b) 4 : 3
(c) 5 : 4 (d) 4 : 5

208. ABCD is a cyclic quadrilateral and AC is a diameter. If $\angle DAC$ = 55°, then value of $\angle ACD$ is

(a) 55° (b) 35° (c) 145° (d) 125°

209. Each of the circles of equal radii with centres A and B pass through the centre of one another. They cut at C and D then $\angle DBC$ is equal to

(a) 60° (b) 100° (c) 120° (d) 140°

210. The three equal circles touch each other externally. If the centres of these circles are A, B, C, then ABC is

(a) a right angle triangle
(b) an equilateral triangle
(c) an isosceles triangle
(d) a scalene triangle

211. 'O' is the centre of the circle, AB is a chord of the circle, $OM \perp AB$. If AB = 20 cm, $OM = 2\sqrt{11}$ cm, then radius of the circle is

(a) 15 cm (b) 12 cm
(c) 10 cm (d) 11 cm

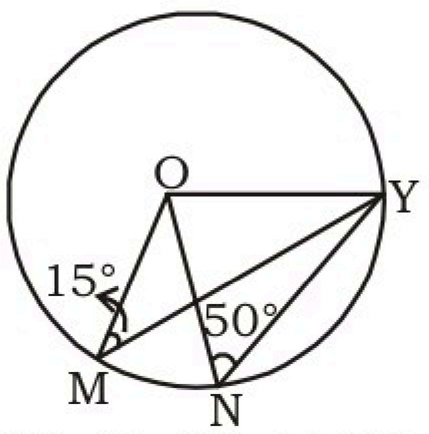
212. In ΔABC, $\angle ABC = 70°$, $\angle BCA$ = 40°, O is the point of inter-section of the perpendicular bisectors of the sides, then the angle $\angle BOC$ is

(a) 100° (b) 120° (c) 130° (d) 140°

213. A, B, C are three points on the circumference of a circle and if $\overline{AB} = \overline{AC} = 5\sqrt{2}$ cm and $\angle BAC$ = 90°, find the radius.

(a) 10 cm (b) 5 cm
(c) 20 cm (d) 15 cm

214. In the given figure, $\angle ONY$ = 50° and $\angle OMY$ = 15°. Then the value of the $\angle MON$ is



(a) 30° (b) 40° (c) 20° (d) 70°

215. Two chords AB and CD of a circle with centre O, intersect each other at P. If $\angle AOD$ = 100° and $\angle BOC$ = 70°, then the value of $\angle APC$ is

(a) 80° (b) 75° (c) 85° (d) 95°

216. Chords AC and BD of a circle with centre O intersect at right angles at E. If $\angle OAB$ = 25°, then the value of $\angle EBC$ is

(a) 30° (b) 25° (c) 20° (d) 15°

217. Two circles touch externally at P. QR is a common tangent of the circles touching the circles at Q and R. Then measure of $\angle QPR$ is

(a) 120° (b) 60° (c) 90° (d) 45°

218. Two circles intersect each other at the points A and B. A straight line parallel to AB intersects the circles at C, D, E and F. If CD = 4.5 cm, then the measure of EF is

(a) 1.50 cm (b) 2.25 cm
(c) 4.50 cm (d) 9.00 cm

219. Two circles C_1 and C_2 touch each other internally at P. Two lines PCA and PDB meet the circles C_1 in C, D and C_2 in A, B respectively. If $\angle BDC = 120°$, then the value of $\angle ABP$ is equal to

(a) 60° (b) 80° (c) 100° (d) 120°

220. Two circles having radii r units intersect each other in such a way that each of them passes through the centre of the other. Then the length of their common chord is

(a) $\sqrt{2r}$ units (b) $\sqrt{3r}$ units
(c) $\sqrt{5r}$ units (d) r units

221. Two circles with centres A and B of radii 5 cm and 3 cm respectively touch each other internally. If the perpendicular bisector of AB meets the bigger circle at P and Q, then the value of PQ is

(a) $\sqrt{6}$ cm (b) $2\sqrt{6}$ cm
(c) $3\sqrt{6}$ cm (d) $4\sqrt{6}$ cm

222. The length of a tangent from an external point to a circle is $5\sqrt{3}$ unit. If radius of the circle is 5 units, then the distance of the point from the circle is

(a) 5 units (b) 15 units
(c) – 5 units (d) – 15 units

223. Two circles are of radii 7 cm and 2 cm their centres being 13cm apart. Then the length of direct common tangent to the circles between the points of contact is

(a) 12 cm (b) 15 cm
(c) 10 cm (d) 5 cm

224. The radius of a circle is 6 cm. The distance of a point lying outside the circle from the centre is 10 cm. The length of the tangent drawn from the outside point to the circle is

(a) 5 cm (b) 6 cm
(c) 7 cm (d) 8 cm

225. DE is a tangent to the circumcircle of ΔABC at the vertex A such that $DE \parallel BC$. If AB = 17 cm, then the length of AC is equal to

(a) 16.0 cm (b) 16.8 cm
(c) 17.3 cm (d) 17 cm

226. ST is a tangent to the circle at P and QR is a diameter of the circle. If $\angle RPT$ = 50°, then the value of $\angle SPQ$ is

(a) 40° (b) 60° (c) 80° (d) 100°

227. If PA and PB are two tangents to a circle with centre O such that $\angle AOB$ = 110°, then $\angle APB$ is

(a) 90° (b) 70° (c) 60° (d) 55°

228. ABC is an equilateral triangle and O is its circumcentre, then the $\angle BOC$ is

(a) 100° (b) 110° (c) 120° (d) 130°

229. In a ΔABC, $\angle A + \angle B$ = 118°, $\angle A + \angle C = 96°$. Find the value of $\angle A$.

(a) 36° (b) 40° (c) 30° (d) 34°

230. In ΔABC, if $AD \perp BC$, then $AB^2 + CD^2$ is equal to

(a) $2BD^2$ (b) BD^2+AC^2
(c) $2\ AC^2$ (d) None of these

231. $\angle A + \frac{1}{2}\angle B + \angle C = 140°$, then $\angle B$ is

(a) 50° (b) 80° (c) 40° (d) 60°

232. In triangle ABC a straight line parallel to BC intersects AB and AC at D and E respectively. If AB = 2AD, then DE : BC is

(a) 2 : 3 (b) 2 : 1
(c) 1 : 2 (d) 1 : 3

233. In a ΔABC, If $2\angle A = 3\angle B = 6\angle C$, value of $\angle B$ is

(a) 60° (b) 30° (c) 45° (d) 90°

234. If in a triangle ABC, D and E are on the sides AB and AC, such that, DE is parallel to BC and $\frac{AD}{BD} = \frac{3}{5}$. If AC = 4 cm, then AE is

(a) 1.5 cm (b) 2.0 cm
(c) 1.8 cm (d) 2.4 cm

235. The measure of the angle between the internal and extenal bisectors of an angle is

(a) 60° (b) 70° (c) 80° (d) 90°

236. The internal bisectors of the angles B and C of a triangle ABC meet at I. If $\angle BIC = \frac{\angle A}{2}$ + X, then X is equal to

(a) 60° (b) 30° (c) 90° (d) 45°

237. The side BC of a triangle ABC is extended up to D. If $\angle$ ACD = 120° and $\angle ABC = \frac{1}{2}\angle CAB$, then the value of $\angle ABC$ is

(a) 80° (b) 40° (c) 60° (d) 20°

238. In ΔABC, D is the mid-point of BC. Length AD is 27 cm. N is a point in AD such that the length of DN is 12 cm. The distance of N from the centroid of ΔABC is equal to

(a) 3 cm (b) 6 cm
(c) 9 cm (d) 15 cm

239. Internal bisectors of $\angle Q$ and $\angle R$ of $\triangle PQR$ intersect at O. If $\angle ROQ$ = 96° then the value of $\angle RPQ$ is :
(a) 12° (b) 24° (c) 36° (d) 6°
(SSC CGL 16-8-2015, Morning)

240. If D, E and F are the mid points of BC, CA and AB respectively of the $\triangle ABC$. The ratio of area of the parallelogram DEFB and area of the trapezium CAFD is:
(a) 1 : 2 (b) 3 : 4
(c) 1 : 3 (d) 2 : 3
(SSC CGL 16-8-2015, Morning)

241. If the three angles of a triangle are:
$(x+15)^{\circ}$, $\left(\frac{6x}{5}+6\right)^{0}$ and $\left(\frac{2x}{3}+30\right)^{0}$
then the traingle is :
(a) isosceles (b) equilateral
(c) right angled (d) scalene
(SSC CGL 16-8-2015, Morning)

242. G is the centroid of $\triangle$ABC. The medians AD and BE intersect at right angles. If the lengths of AD and BE are 9 cm and 12 cm respectively; then the length of AB (in cm) is?
(a) 11 (b) 10 (c) 10.5 (d) 9.5
(SSC CGL 16-8-2015, Morning)

243. Among the equations
$x + 2y + 9 = 0$; $5x - 4 = 0$;
$2y - 13 = 0$; $2x - 3y = 0$,
The equation of the straight line passing through origin is:
(a) $2y - 13 = 0$ (b) $x + 2y + 9 = 0$
(c) $2x - 3y = 0$ (d) $5x - 4 = 0$
(SSC CGL 16-8-2015, Morning)

244. The area of the triangle formed by the graphs of the equations $x = 0$, $2x + 3y = 6$ and $x + y = 3$ is;
(a) 1 sq. unit (b) 3. sq. units
(c) $4\frac{1}{2}$ sq. units(d) $1\frac{1}{2}$ sq. units
(SSC CGL 16-8-2015, Morning)

245. In $\triangle$ABC, D and E are mid points of sides AB and AC respectively. If $\angle BAC$ = 60° and $\angle ABC$ = 65° then $\angle CED$ is:
(a) 125° (b) 75° (c) 105°(d) 130°
(SSC CGL 16-8-2015, Evening)

246. Given that : $\triangle ABC \sim \triangle PQR$, if $\frac{\text{area}(\Delta PQR)}{\text{area}(\Delta ABC)} = \frac{256}{441}$ and PR = 12 cm, then AC is equal to?
(a) $12\sqrt{2}$ cm (b) 15.5 cm
(c) 16 cm (d) 15.75 cm
(SSC CGL 16-8-2015, Evening)

247. O is the incentre of $\triangle$PQR and $\angle$QPR = 50°, then the measure of $\angle$QOR is:
(a) 125° (b) 100° (c) 130°(d) 115°
(SSC CGL 16-8-2015, Evening)

248. O is the circumcentre of $\triangle ABC$. If $\angle BAC$ = 85°, $\angle BCA$ = 75°, the $\angle OAC$ is equal to:
(a) 70° (b) 60° (c) 50° (d) 40°
(SSC CGL 16-8-2015, Evening)

249. AC is a transverse common tangent to two circle with centres P and Q and radii 6 cm and 3 cm at the point A and C respectively. If AC cuts PQ at the point B and AB = 8 cm, then the length of PQ is:
(a) 12 cm (b) 15 cm
(c) 13 cm (d) 10 cm
(SSC CGL 16-8-2015, Evening)

250. AB and CD are two parallel chords of a circle lying on the opposite side of the centre and the distance between them is 17 cm. The length of AB and CD are 10 cm and 24 cm respectively. The radius(in cm) of the circle is:
(a) 13 (b) 18 (c) 9 (d) 15
(SSC CGL 16-8-2015, Evening)

251. ABCD is a cyclic quadrilateral. Diagonals AC and BD meet at P. If $\angle APB$ = 110° and $\angle CBD$ = 30°, then $\angle$ADB measures:
(a) 70° (b) 55° (c) 30° (d) 80°
(SSC CGL 16-8-2015, Evening)

252. The area of the triangle formed by the graphs of the equations $x = 4$, $y = 3$ and $3x + 4y = 12$ is:
(a) 6 sq. units (b) 4 sq. units
(c) 3 sq. units (d) 12 sq. units
(SSC CGL 16-8-2015, Evening)

253. If a clock started at noon, then the angle turned by hour hand at 3:45 PM is:
(a) $104\frac{1^{\circ}}{2}$ (b) $97\frac{1^{\circ}}{2}$
(c) $112\frac{1^{\circ}}{2}$ (d) $117\frac{1^{\circ}}{2}$
(SSC CGL 09-08-2015, Morning)

254. In $\triangle$ABC, a line through A cuts the side BC at D such that BD : DC = 4 : 5. If the area of $\triangle$ABD = 60 cm² ,then the area of $\triangle$ADC is:
(a) 50 cm² (b) 60 cm²
(c) 75 cm² (d) 90 cm²
(SSC CGL 09-08-2015, Morning)

255. The measure of an angle whose supplement is three times as large as its complement, is
(a) 30° (b) 45° (c) 60° (d) 75°
(SSC CGL 09-08-2015, Morning)

256. A tangent is drawn to a circle of radius 6 cm from a point situated at a distance of 10 cm from the centre of the circle. The length of tangent will be
(a) 4 cm (b) 5 cm
(c) 8 cm (d) 7 cm
(SSC CGL 09-08-2015, Morning)

257. A square is inscribed in a quarter-circle in such a manner that two of its adjacent vertices lie on the two radii at an equal distance from the centre, while the other two vertices lie on the circular arc. If the square has sides of length x. then the radius of the circle is:
(a) $\frac{16x}{\pi+4}$ (b) $\frac{2x}{\sqrt{x}}$
(c) $\frac{\sqrt{5}x}{\sqrt{2}}$ (d) $\sqrt{2}x$
(SSC CGL 09-08-2015, Morning)

258. Two chords of length a unit and b unit of a circle make angles 60° and 90° at the centre of a circle respectively, then the correct relation is:
(a) b = $\sqrt{2}$ a (b) b = 2a
(c) b = $\sqrt{3}$ a (d) b = 3/2a
(SSC CGL 09-08-2015, Morning)

259. The measures of two angles of a triangle is in the ratio 4 : 5. If the sum of these two measures is equal to the measure of the third angle. Find the smallest angle.
(a) 90° (b) 50° (c) 10° (d) 40°
(SSC CGL 09-08-2015, Evening)

260. ABC is a triangle and the sides AB, BC and CA are produced to E,F and G respectively. If $\angle CBE = \angle ACF = 130°$, then the value of $\angle GAB$ is:

(a) 100° (b) 80°

(C) 130° (d) 90°

(SSC CGL 09-08-2015, Evening)

261. If two medians BE and CF of a triangle ABC, intersect each other at G and if BG = CG, $\angle BGC = 60°$, BC = 8 cm , then area of the triangle ABC is:

(a) $96\sqrt{3}$ cm² (b) $48\sqrt{3}$ cm²

(c) 48cm² (d) $54\sqrt{3}$ cm²

(SSC CGL 09-08-2015, Evening)

262. ABC is a cyclic triangle and the bisectors of $\angle BAC$, $\angle ABC$ and $\angle BCA$ meet the circle at P, Q and R respectively. Then the angle $\angle RQP$ is:

(a) $90° - \frac{B}{2}$ (b) $90° + \frac{C}{2}$

(c) $90° - \frac{A}{2}$ (d) $90 + \frac{B}{2}$

(SSC CGL 09-08-2015, Evening)

263. Two circles touch externally. The sum of their areas is 130π sq cm and the distance between their centres is 14 cm. The radius of the smaller circle is:

(a) 2cm (b) 3 cm

(c) 4 cm (d) 5 cm

(SSC CGL 09-08-2015, Evening)

264. XY and XZ are tangents to a circle. ST is another tangent to the circle at the point R on the circle which intersects XY and XZ at S and T respectively, If XY = 9 cm and TX = 15 cm, then RT is:

(a) 4.5 cm (b) 3 cm

(c) 7.5 cm (d) 6 cm

(SSC CGL 09-08-2015, Evening)

265. In a rhombus ABCD, $\angle A = 60°$ and AB = 12 cm. Then the diagonal BD is:

(a) $2\sqrt{3}$ cm (b) 6 cm

(c) 12 cm (d) 10 cm

(SSC CGL 09-08-2015, Evening)

266. If PQRS is a rhombus and $\angle SPQ = 50°$, then $\angle RSQ$ is:

(a) 75° (b) 45° (c) 55° (d) 65°

(SSC CGL 09-08-2015, Evening)

267. Two isosceles triangles have equal vertical angles and their areas are in the ratio 9 : 16. then the ratio of their corresponding heights is

(A) 4.5 : 8 (b) 3 : 4

(c) 4 : 3 (d) 8 : 4.5

(CPO 21-06-2015, Morning)

268. The perimeters of two similar triangles are 30 cm and 20 cm respectively. If one side of the first triangle is 9 cm. Determine the corresponding side of the second triangle.

(a) 15 cm (b) 6 cm

(c) 13.5 cm (d) 5 cm

(CPO 21-06-2015, Morning)

269. If in a triangle ABC, BE and CF are two medians perpendicular to each other and if AB = 19 cm and AC = 22 cm then the length of BC is

(a) 20.5 cm (b) 19.5 cm

(c) 26 cm (d) 13 cm

(CPO 21-06R-2015, Morning)

270. 'O' is the circumcentre of triangle ABC. If $\angle BAC = 50°$ then $\angle OBC$ is

(a) 100° (b) 130° (c) 40° (d) 50°

(CPO 21-06-2015, Morning)

271. Two circles of radii 10 cm and 8 cm intersect and the length of the common chord is 12 cm. Then the distance between their centres is:

(a) 13.3 (b) 15 (c) 10 (d) 8

(CPO 21-06-2015, Morning)

272. The diagonal of a quadrilateral shaped field is 24 m and the perpendiculars dropped on it from the remaining opposite vertices are 8 m and 13 m. The area of the field is?

(a) 252 m² (b) 1152 m²

(c) 96 m² (d) 156 m²

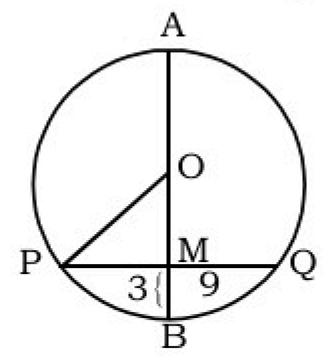
(CPO 21-06-2015, Morning)

273. The angle between the graph of the linear equation $239x - 239y + 5 = 0$ and the x-axis is

(a) 30° (b) 0° (c) 45° (d) 60°

(CPO 21-06-2015, Morning)

274. In a given circle, the chord PQ is of length 18 cm. AB is the perpendicular bisector of PQ at M. If MB = 3.find the length of AB

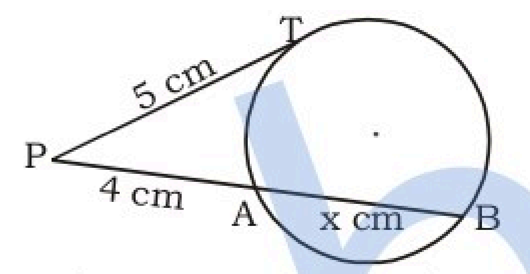


(a) 25 cm (b) 30 cm

(c) 28 cm (d) 27 cm

(CPO 21-06-2015, Evening)

275. In the given figure, PAB is a secant and PT is a tangent to the circle from P. If PT = 5 cm, PA = 4 cm and AB = x cm, then x is



(a) 4/9 cm (b) 2/3 cm

(c) 9/4 cm (d) 5 cm

(CPO 21-06-2015, Evening)

276. Two circles with their centres at O and P and radii 8 cm and 4 cm respectively touch each other externally. The length of their common tangent is

(a) 8 cm (b) 8.5 cm

(c) $8\sqrt{2}$ cm (d) $8\sqrt{3}$ cm

(CPO 21-06-2015, Evening)

277. The centroid of a ΔABC is G. The area of ΔABC is 60 cm². The area of ΔGBC is

(a) 30 cm² (b) 40 cm²

(c) 10 cm² (d) 20 cm²

(CGL Mains 21-06-2015)

278. In trapezium ABCD, AB $\parallel$ CD and AB = 2 CD. Its diagonals intersect at O. If the area of $\Delta AOB = 84$ cm², then the area of ΔCOD is equal to

(a) 21 cm² (b) 72 cm²

(c) 42 cm² (d) 26 cm²

(CGL Mains 21-06-2015)

279. If O is the circumcentre of a triangle ABC lying inside the triangle, the $\angle OBC + \angle BAC$ is equal to

(a) 120° (b) 110° (c) 90° (d) 60°

(CGL Mains 21-06-2015)

280. AD is perpendicular to the internal bisector of $\angle ABC$ of ΔABC. DE is drawn through D and parallel to BC to meet AC at E. If the length of AC is 12 cm, then the length of AE (in cm.) is
(a) 8 (b) 3 (c) 4 (d) 6
(CGL Mains 21-06-2015)

281. The interior angle of regular polygon exceeds its exterior angle by 108°. The number of sides of the polygon is
(a) 10 (b) 14 (c) 12 (d) 16
(CGL Mains 21-06-2015)

282. Quadrilateral ABCD is circumscribed about a circle. If the lengths of AB, BC, CD are 7 cm, 8.5 cm and 9.2 cm respectively, then the length (in cm) of DA is
(a) 16.2 (b) 7.7 (c) 10.2 (d) 7.2
(CGL Mains 21-06-2015)

283. Given that the ratio of altitudes of two triangles is 4:5, ratio of their areas is 3 : 2, The ratio of their corresponding bases is
(a) 5 : 8 (b) 15 : 8
(c) 8 : 5 (d) 8 : 15
(CGL Mains 21-06-2015)

284. In ΔABC, $\angle BAC = 90°$ and $AD \perp BC$. If BD = 3 cm and CD = 4 cm, then length of AD is
(a) $2\sqrt{3}$ cm (b) 3.5 cm
(c) 6 cm (d) 5 cm
(CGL Mains 21-06-2015)

285. In triangle ABC, $DE \parallel BC$ where D is a point on AB and E is point on AC. DE divides the area of ΔABC into two equal parts. Then DB : AB is equal to
(a) $\sqrt{2} : (\sqrt{2}+1)$ (b) $(\sqrt{2}-1) : \sqrt{2}$
(c) $\sqrt{2} : (\sqrt{2}-1)$ (d) $(\sqrt{2}+1) : \sqrt{2}$
(CGL Mains 21-06-2015)

286. ABCD is a cyclic quadrilateral. AB and DC when produced meet at P, If PA = 8 cm, PB = 6, PC = 4 cm, then the length (in cm) of PD is
(a) 10 cm (b) 6 cm
(c) 12 cm (d) 8 cm
(CGL Mains 21-06-2015)

287. ABC is a triangle in which $DE \parallel BC$ and AD : DB = 5 : 4. Then DE : BC is
(a) 4 : 5 (b) 9 : 5
(c) 4 : 9 (d) 5 : 9
(CGL Mains 12-04-2015)

288. The radii of two concentric circles are 17 cm and 25 cm. a straight line PQRS intersects the larger circle at the points P and S and intersects the smaller circle at the points Q and R. If QR = 16 cm, then the length (in cm.) of PS is
(a) 41 (b) 33 (c) 32 (d) 40
(CGL Mains 12-04-2015)

289. AB is a diameter of a circle with centre O. The tangents at C meets AB produced at Q. If $\angle CAB = 34°$, then measure of $\angle CBA$ is
(a) 56° (b) 68° (c) 34° (d) 124°
(CGL Mains 12-04-2015)

290. For an equilateral triangle, the ratio of the in-radius and the outer-radius is
(a) 1 : 2 (b) 1 : 3
(c) $1 : \sqrt{2}$ (d) $1 : \sqrt{3}$
(CGL Mains 12-04-2015)

291. If a and b are the lengths of the sides of a right angled triangle whose hypotenuse is 10 and whose area is 20, then the value of $(a + b)^2$ is
(a) 140 (b) 120 (c) 180 (d) 160
(CGL Mains 12-04-2015)

292. Let P and Q be two points on a circle with centre O. If two tangents of the circle through P and Q meet at A with $\angle PAQ = 48°$, then $\angle APQ$ is
(a) 96° (b) 66°
(c) 48° (d) 60°
(CGL Mains 12-04-2015)

293. If the sides of a triangle are in the ratio $3 : 1\frac{1}{4} : 3\frac{1}{4}$, then the triangle is
(a) Right triangle
(b) Isosceles triangle
(c) Obtuse triangle
(d) Acute triangle
(CGL Mains 12-04-2015)

294. If the ratio of the angles of a quadrilateral is 2 : 7 :2 : 7, then it is a
(a) trapezium (b) square
(c) parallelogram (d) rhombus
(CGL Mains 12-04-2015)

295. The length of two parallel chords of a circle of radius 5 cm are 6 cm and 8 cm in the same side of the centre. The distance between them is
(a) 1 cm (b) 2 cm
(c) 3 cm (d) 1.5 cm
(LDC 01-11-2015 Morning)

296. AB is a diameter of a circle having centre at O.P is a point on the circumference of the circle. If $\angle POA = 120°$, then measure of $\angle PBO$ is
(a) 75° (b) 60° (c) 68° (d) 70°
(LDC 01-11-2015 Morning)

297. ABC is a triangle in which $\angle A = 90°$. Let P be any point on side AC. If BC = 10 cm, AC = 8 cm and BP= 9 cm, then AP =
(a) $2\sqrt{5}$ cm (b) $3\sqrt{5}$ cm
(c) $2\sqrt{3}$ cm (d) $3\sqrt{3}$ cm
(LDC 01-11-2015 Morning)

298. ABCD is a cyclic quadrilateral, AB is the diameter of the circle. If $\angle ACD = 50°$, the measure of $\angle BAD$ is
(a) 130° (b) 40° (c) 50° (d) 140°
(LDC 01-11-2015 Morning)

299. BE, CF are the two medians of ΔABC and G is their point of intersection. EF cuts AG at O. Ratio of AO : OG is equal to
(a) 3 : 1 (b) 1 : 2
(c) 2 : 3 (d) 1 : 3
(LDC 01-11-2015 Morning)

300. AB is the diameter of a circle with centre O. P be a point on it. If $\angle POA = 120°$. Then, $\angle PBO$ =?
(a) 60° (b) 50° (c) 120° (d) 45°
(LDC 01-11-2015 Evening)

301. A circle touches the four sides of a quadrilateral ABCD. The value of $\frac{(AB+CD)}{CB+DA}$ is equal to:
(a) $\frac{1}{3}$ (b) 1 (c) $\frac{1}{4}$ (d) $\frac{1}{2}$
(LDC 01-11-2015 Evening)

302. D and E are mid-points of sides AB and AC respectively of the ΔABC. A line drawn from A meets BC at H and DE at K. AK : KH = ?
(a) 2 : 1 (b) 1 : 1
(c) 1 : 3 (d) 1 : 2
(LDC 01-11-2015 Evening)

303. Let ABC be an equilateral triangle and AD perpendicular to BC, Then

$AB^2 + BC^2 + CA^2 = ?$

(a) $3AD^2$ (b) $5AD^2$

(c) $2AD^2$ (d) $4AD^2$

(LDC 01-11-2015 Evening)

304. AB and AC are tangents to a circle with centre O. A is the external point of the circle. The line AO intersect the chord BC at D. The measure of the $\angle BDO$ is:

(a) 45° (b) 75° (c) 90° (d) 60°

(LDC 01-11-2015 Evening)

305. In $\triangle ABC$, the external bisectors of the angles $\angle B$ and $\angle C$ meet at the point O. If $\angle A = 70°$, then the measure of $\angle BOC$ is:

(a) 75° (b) 50° (c) 55° (d) 60°

(LDC 15-11-2015 Morning)

306. ABCD is a cyclic trapezium whose sides AD and BC are parallel to each other; if $\angle ABC =$ 75° then the measure of $\angle BCD$ is:

(a) 75° (b) 95° (c) 45° (d) 105°

(LDC 15-11-2015 Morning)

307. The distance between the centers of two circles of radii 6 cm and 3 cm is 15 cm. The length of the transverse common tangent to the circles is:

(a) $7\sqrt{6}$cm (b) 12 cm

(c) $6\sqrt{6}$cm (d) 18 cm

(LDC 15-11-2015 Morning)

308. $\angle A$ of $\triangle ABC$ is a right angle. AD is perpendicular on BC. If BC = 14 and BD = 5 cm, then measure of AD is:

(a) $\sqrt{5}$cm (b) $3\sqrt{5}$cm

(c) $3.5\sqrt{5}$cm (d) $2\sqrt{5}$cm

(LDC 15-11-2015 Evening)

309. In $\triangle ABC$, $AD \perp BC$ and $AD^2 = BD.DC$. The measure of $\angle BAC$ is:

(a) 75° (b) 90° (c) 45° (d) 60°

LDC 15-11-2015 Evening)

310. Let $AX \perp BC$ of an equilateral triangle ABC. Then the sum of the perpendicular distances of the sides of $\triangle ABC$ from any point inside the triangle is:

(a) Greater than AX

(b) Less than AX

(c) Equal to BC

(d) Equal to AX

(LDC 06-12-2015 Morning)

311. AB is a diameter of a circle having centre at O. PQ is a chord which does not intersect AB. Join AP and BQ. If $\angle PAB = \angle ABQ$, then ABQP is a:

(a) Cyclic rhombus

(b) Cyclic rectangle

(c) Cyclic trapezium

(d) Cyclic square

(LDC 06-12-2015 Morning)

312. The distance between centres of two circles of radii 3 cm and 8 cm is 13 cm. If the points of contact of a direct common tangent the circles are P and Q, then the length of the line segment PQ is:

(a) 11.9 cm (b) 12 cm

(c) 11.5 cm (d) 11.58 cm

(LDC 06-12-2015 Evening)

313. Two circles of radii 5 cm and 3 cm touch externally, then the ratio in which the direct common tangent to the circles divides externally the line joining the centres of the circles is:

(a) 5 : 3 (b) 3 : 5

(c) 1.5 : 2. 5 (d) 2.5 : 1.5

(LDC 06-12-2015 Evening)

314. ABCD is a square. Draw a triangle QBC on side BC considering BC as base and draw a triangle PAC on AC as its base such that $\triangle QBC \sim \triangle PAC$ then $\frac{\text{Area of } \triangle QBC}{\text{Area of } \triangle PAC}$ is equal to:

(a) $\frac{2}{3}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{1}$

(LDC 06-12-2015 Evening)

315. In $\triangle ABC$, AB = BC = K, AC = $\sqrt{2}$ K, then $\triangle ABC$ is a :

(a) Right isosceles triangle

(b) Isosceles triangle

(c) Right - angled triangle

(d) Equilateral triangle

(LDC 06-12-2015 Evening)

316. In $\triangle ABC$, $\angle B = 60°$, and $\angle C = 40°$; AD and AE are respectively the bisector of $\angle A$ and perpendicular on BC. The measure of $\angle EAD$ is:

(a) 9° (b) 11° (c) 10° (d) 12°

(LDC 06-12-2015 Evening)

317. The hypotenuse of a right-angled triangle is 39 cm and the difference of other two sides is 21 cm. Then, the area of the triangle is

(a) 180 sq.cm (b) 270 sq.cm

(c) 450 sq.cm (d) 540 sq.cm

(LDC 12-12-2015 Morning)

318. The side BC of a triangle ABC is proceed to D. If $\angle ACD = 112°$ and $\angle B = \frac{3}{4}\angle A$, then the measure of $\angle B$ is

(a) 64° (b) 30° (c) 48° (d) 45°

(LDC 12-12-2015 Morning)

319. If the complement of an angle is one-fourth of its supplementary angle, then the angle is

(a) 120° (b) 60° (c) 30° (d) 90°

(LDC 12-12-2015 Morning)

320. The medians CD and BE of a triangle ABC intersect each other at O. The ratio of Ar $\triangle ODE$:Ar $\triangle ABC$ is equal to

(a) 1 : 12 (b) 12 : 1

(c) 4 : 3 (d) 3 : 4

(LDC 12-12-2015 Morning)

321. The diameter of a circle is 10 cm. If the distance of a chord from the centre of the circle be 4 cm, then the length of the chord is:

(a) 5 cm. (b) 6 cm.

(c) 4 cm. (d) 3 cm.

(LDC 12-12-2015 Evening)

322. The length of tangent drawn from an external point P to a circle of radius 5 cm. is 12 cm. The distance of P from the centre of the circle is:

(a) 12 cm. (b) 9 cm.

(c) 7 cm. (d) 13 cm.

(LDC 12-12-2015 Evening)

323. In $\triangle ABC$, O is the orthocentre and $\angle BOC = 80°$, the measure of $\angle BAC$ is:

(a) 120° (b) 90° (c) 80° (d) 100°

(LDC 12-12-2015 Evening)

324. In triangle ABC, M is the midpoint of BC and N is the mid point of AM. BN when extended intersect AC at D. If area of triangle ABC is 20 sq. units then what is the area of $\triangle$ AND?

(a) 1.67 sq.units

(b) 1.5 sq. units

(c) 2 sq.units

(d) 3 sq. units

325. A line PQ interesect the sides AB, AC of the triangle ABC, at P, Q respectively in such a way that AP : PB = 3 : 2 then arΔAPQ : arΔABC is

(a) 9 : 4 (b) 25 : 4

(c) 9 : 25 (d) 4 : 9

(SSC CPO 20-03-2016, Morning)

326. AB and AC are two chords of a circle. The tangents at B and C meet at P. If $\angle$BAC = 54°, then the measure of $\angle$BPC is

(a) 54° (b) 108°

(c) 72° (d) 36°

(SSC CPO 20-03-2016, Morning)

327. The length of the diagonal BD of the parallelogram ABCD is 12 cm. P and Q are the centroids of the ΔABC and ΔADC respectively. The length (in cm) of the line segment PQ is

(a) 4 (b) 6

(c) 3 (d) 5

(SSC CPO 20-03-2016, Morning)

328. PQRS is a cyclic quadrilateral, such that ratio of measures of $\angle$P, $\angle$Q and $\angle$R is 1 : 3 : 4 then the measure of $\angle$S is

(a) 72° (b) 36°

(c) 108° (d) 144°

(SSC CPO 20-03-2016, Morning)

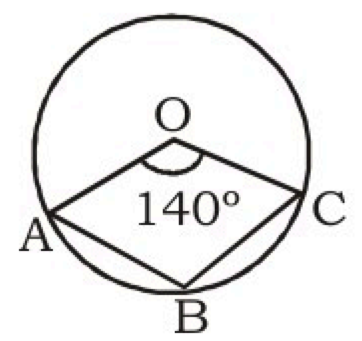
329. A chord of length 24 cm is at a distance of 5 cm from the centre of a circle. The length of the chord of the same circle which is at a distance of 12 cm from the centre is

(a) 17 cm (b) 12 cm

(c) 10 cm (d) 11 cm

(SSC CPO 20-03-2016, Morning)

330. In the adjoining figure $\angle$AOC = 140° where O is the centre of the circle then $\angle$ABC is equal to:



(a) 90° (b) 110°

(c) 100° (d) 40°

(SSC CPO 20-03-2016, Evening)

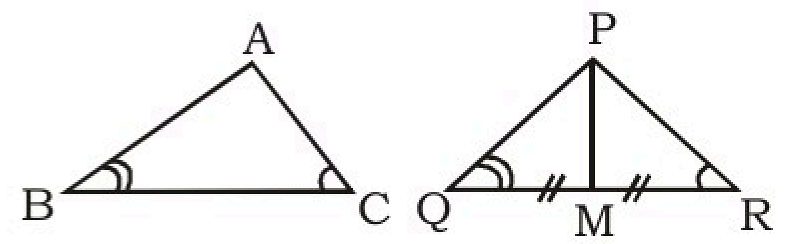
331. The ratio of inradius and circumradius of an equilateral triangle is:

(a) 1:2 (b) 2:1

(c) $1:\sqrt{2}$ (d) $\sqrt{2}:1$

(SSC CPO 20-03-2016, Evening)

332. In ΔABC and ΔPQR, $\angle B = \angle Q$, $\angle C = \angle R$. M is the midpoint on QR, If AB:PQ = 7 : 4, then $\dfrac{\text{area }(\Delta ABC)}{\text{area }(\Delta PMR)}$ is:



(a) $\dfrac{35}{8}$ (b) $\dfrac{35}{16}$

(c) $\dfrac{49}{16}$ (d) $\dfrac{49}{8}$

(SSC CPO 20-03-2016, Evening)

333. In ΔABC, the line parallel to BC intersect AB & AC at P & Q respectively. If AB : AP = 5 : 3, then AQ : QC is:

(a) 3 : 2 (b) 1 : 2

(c) 3 : 5 (d) 2 : 3

(SSC CPO 20-03-2016, Evening)

334. In a ΔPQR, $\angle$Q = 55° and $\angle$R = 35°. Find the ratio of angles subtended by side QR on circumcentre, incentre and orthocentre of the triangle.

(a) 3 : 2 : 1 (b) 3 : 2 : 4

(c) 3 : 2 : 4 (d) 4 : 3 : 2

(SSC CPO(Re) 04-06-2016, Morning)

335. How many straight lines can you draw to divide a square into two congruent parts?

(a) 1 (b) 2

(c) 4 (d) More than 4

(SSC CPO(Re) 04-06-2016, Morning)

336. The distance between centres of two circles of radii 4 cm and 9 cm is 13 cm. If the points of contact of a direct common tangent to the circle are P and Q, then length of common tangent PQ is:

(a) 10 cm (b) 12 cm

(c) 15 cm (d) 14 cm

(SSC CPO(Re) 04-06-2016, Evening)

337. If the distance between two points (0,–5) and (x, 0) is 13 unit, then the value of x is:

(a) 10 unit (b) 12 unit

(c) 9 unit (d) 6 unit

(SSC CPO(Re) 04-06-2016, Evening)

338. With the vertices of the triangle ABC as centres, three circles are described, each touching the other two externally. If the sides of the triangles are 10 cm, 8 cm and 6 cm find the radii of the circles.

(a) 4 cm, 5 cm, 2 cm

(b) 3 cm, 4 cm, 5 cm

(c) 4 cm, 6 cm, 2 cm,

(d) 3 cm, 5 cm, 2 cm,

(SSC CPO(Re) 04-06-2016, Evening)

339. In a trianlge ABC, if $\angle$A = 55° and $\angle$C = 80°, then which one is true:

(a) AB > AC > BC

(b) BC > AB > AC

(c) CA > AB > BC

(d) AB > BC > AC

(SSC CPO(Re) 05-06-2016, Morning)

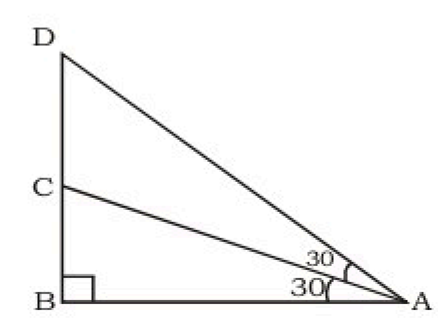
340. The Centre of circle is O and PT is a tangent at T. BC is the diameter of the circle. If BC is extended, then it meets the tangent PT at P. It is given that PC = 4 cm and PT = 8 cm. Find the radius of the circle.

(a) 5 cm (b) 6 cm

(c) 7 cm (d) 4 cm

(SSC CPO(Re) 05-06-2016, Morning)

341. In the following figure, which of the statements is true?



(a) AB = AC (b) AB = BD

(c) AC = BD (d) CA = CD

(SSC CPO(Re) 05-06-2016, Evening)

342. In ΔABC, $\angle$B = 70° and $\angle$C = 30°, AD and AE are respectively the perpendicular on side BC and bisector of $\angle$A. The measure of $\angle$DAE is:

(a) 24° (b) 10°

(c) 15° (d) 20°

(SSC CPO(Re) 05-06-2016, Evening)

343. 2 equal tangents PA and PB are drawn from an external point P on a circle with centre O. What is the length of each tangent, if P is 12 cm from the centre and the angle between the tangents is 120°?

(a) 24 cm

(b) 6 cm

(c) 8 cm

(d) cannot be determined

(SSC CPO(Re) 06-06-2016, Morning)

344. If two medians BE and CF of a triangle ABC, intersect each other at G and if BG = CG, angle BGC = 120°, BC = 10 cm, then area of the triangle ABC is:

(a) $50\sqrt{3}$ cm² (b) 60 cm²

(c) 25 cm² (d) $25\sqrt{3}$ cm²

(SSC CPO(Re) 06-06-2016, Evening)

345. A circle with centre O has a tangent PQ at point Q. The line segment joined from P to a Point A on the circle meets the circle at one more point B. BA< PB and AB is of length 5 cms. If PQ is of length 6 cms, then PA equal to:

(a) 9 cm (b) 6 cm

(c) 4 cm (d) 3 cm

(SSC CPO(Re) 07-06-2016, Morning)

346. ABC is an equilateral triangle. Points D, E, and F are taken as the mid-point on sides AB, BC, CA respectively, so that AD = BE = CF. Then AE, BF, CD enclosed a triangle which is:

(a) equilateral

(b) isosceles triangle

(c) right angle triangle

(d) None of these

(SSC CPO(Re) 07-06-2016, Evening)

347. The measures of three angles of a quadrilateral are in the ratio 1 : 2 : 3. If the sum of these three measures is equal to the measure of the fourth angle, find the smallest angle.

(a) 30° (b) 40°

(c) 60° (d) 50°

(SSC CPO(Re) 07-06-2016, Evening)

348. ΔABC is similar to ΔDEF. If the sides of ΔABC, that is AB, BC and CA, are 3,4 and 5 cms respectively, what would be the perimeter of the ΔDEF, if the side DE measures 12 cms?

(a) 24 cms (b) 30 cms

(c) 36 cms (d) 48 cms

(SSC CPO(Re) 08-06-2016, Morning)

349. Astha cuts a triangle out of a cardboard and tries to balance the triangle horizontally at the tip of her finger. On what point will she be able to balance the shape for any kind of triangle?

(a) Incentre (b) Circumcentre

(c) Centroid (d) Orthocentre

(SSC CPO(Re) 08-06-2016, Morning)

350. The perpendicular distance from the centre of a circle to a chord is 16 cm. If the diameter of the circle is 40 cm, what is the length of the chord?

(a) 12 cm (b) 16 cm

(c) 24 cm (d) 30 cm

(SSC CPO(Re) 08-06-2016, Evening)

351. The difference between the interior angle and the exterior angle of a regular polygons is 90°. Find the number of side.

(a) 6 (b) 5

(c) 8 (d) 10

(SSC CPO(Re) 08-06-2016, Evening)

352. ABCD is a square. Draw an equilateral triangle PBC on side BC considering BC is a base and an equilateral triangle QAC on diagonal AC considering AC is a base. Find the value of

$$\frac{area\ of\ \Delta PBC}{area\ of\ \Delta QAC}.$$

(a) $\frac{1}{2}$ (b) 1

(c) $\frac{1}{3}$ (d) $\frac{1}{4}$

(SSC CPO(Re) 09-06-2016, Morning)

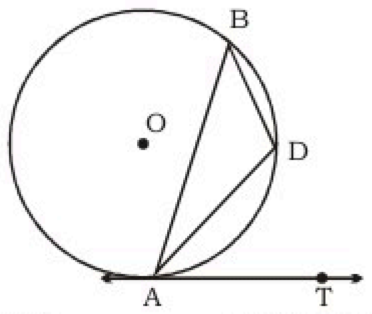
353. In a rhombus ABCD, $\angle$B = 60° and AB = 14 cm. Then the diagonal AC is:

(a) 14 cm (b) $14\sqrt{3}$ cm

(c) 12 cm (d) 15 cm

(SSC CPO(Re) 09-06-2016, Evening)

354. In the figure below, AB is a chord of a circle with centre O. A tangent AT is drawn at point A so that $\angle$BAT = 50°. Then $\angle$ADB = ?



(a) 120° (b) 130°

(c) 140° (d) 150°

(SSC CPO(Re) 10-06-2016, Evening)

355. In ΔABC, D is the mid-point of BC and G is the centroid. If GD = 5 cm, then the length of AD is:

(a) 10 cm (b) 12 cm

(c) 15 cm (d) 20 cm

(SSC CPO(Re) 10-06-2016, Evening)

356. ΔABC a right angled triangle has $\angle$B = 90° and AC is hypotenuse. D is its circumcentre and AB = 3 cms, BC = 4 cms. The value of BD is

(a) 3 cms (b) 4 cms

(c) 2.5 cms (d) 5.5 cms

(SSC CGL Pre Exam 2016)

357. ΔABC is an equilateral triangle and D, E are midpoints of AB and BC respectively. Then the area of ΔABC: the area of the trapezium ADEC is

(a) 5 : 3 (b) 4 : 1

(c) 8 : 5 (d) 4 : 3

(SSC CGL Pre Exam 2016)

358. In an isosceles triangle ABC, AB = AC, XY||BC. If $\angle$A = 30°, the $\angle$BXY =

(a) 75° (b) 30°

(c) 150° (d) 105°

(SSC CGL Pre Exam 2016)

359. A 8 cm long perpendicular is made from the centre of circle to the 12 cm long chord. Find the diameter of the circle?

(a) 10 cm (b) 12 cm

(c) 16 cm (d) 20 cm

(SSC CGL Pre Exam 2016)

360. In ΔABC and ΔDEF, if $\angle$A = 50°, $\angle$B = 70°, $\angle$C = 60°, $\angle$D = 60°, $\angle$E = 70°, and $\angle$F = 50°, then

(a) ΔABC ~ ΔFED

(b) ΔABC ~ ΔDFE

(c) ΔABC ~ ΔEDF

(d) ΔABC ~ ΔDEF

(SSC CGL Pre Exam 2016)

361. In Δ ABC, the medians AD and BE meet at G. The ratio of the areas of Δ BDG and the quadrilateral GDCE is

(a) 1 : 2 (b) 1 : 3
(c) 2 : 3 (d) 3 : 4

(SSC CGL Pre Exam 2016)

362. If PQRS is cyclic quadrilateral then find the value of $\angle$P + $\angle$Q + $\angle$R + $\angle$S

(a) 300° (b) 450°
(c) 360° (d) 350°

(SSC CGL Pre Exam 2016)

363. XYZ is a right angled triangle and Y = 90°. If XY = 2.5 cm and YZ = 6 cm then the circumradius of Δ XYZ is

(a) 6.5 cm (b) 3.25 cm
(c) 3 cm (d) 2.5 cm

(SSC CGL Pre Exam 2016)

364. O is a centre of a circle. P is an external point of it at distance of 13 cm from O. The radius of the circle is 5 cm. Then the length of a tangent to the circle from P upto the point of contact is

(a) $\sqrt{194}$ cm (b) 10 cm
(c) 12 cm (d) 8 cm

(SSC CGL Pre Exam 2016)

365. G is the centroid of the equilateral triangle ABC, If AB = 9 cm then AG is equal to

(a) $3\sqrt{3}$ cm (b) 3 cm
(c) $\frac{3\sqrt{3}}{\sqrt{2}}$ cm (d) 6 cm

(SSC CGL Pre Exam 2016)

366. In Δ PQR, straight line parallel to the base QR cuts PQ at X and PR at Y. If PX : XQ 5 : 6, then XY : QR will be

(a) 5 : 11 (b) 6 : 5
(c) 11 : 6 (d) 11 : 5

(SSC CGL Pre Exam 2016)

367. The chord AB of a circle of centre O subtends an angle θ with the tangent at A to the circle. Then measure of $\angle$ABO is

(a) θ (b) $90° - \theta$
(c) $2(180° - \theta)$ (d) $90° + \theta$

(SSC CGL Pre Exam 2016)

368. In a Δ ABC, BC is extended upto D; $\angle$ACD = 120°, $\angle B = \frac{1}{2} \angle A$

Then $\angle$A is

(a) 60° (b) 75°
(c) 80° (d) 90°

(SSC CGL Pre Exam 2016)

369. O is the centre of a circle and AB is the tangent to it touching at B. If OB = 3 cm. and OA = 5 cm, then the measure of AB in cm is

(a) 34 cm (b) 2 cm
(c) 8 cm (d) 4 cm

(SSC CGL Pre Exam 2016)

370. The length of the base of an isosceles triangle is $2x$–2y+4z, and its perimeter is $4x$–2y+6z. Then the length of each of the equal sides is

(a) x+y (b) x+y+z
(c) 2(x+y) (d) x+z

(SSC CGL Pre Exam 2016)

371. In Δ PQR, L and M are two points on the sides PQ and PR respectively such that LM II QR. If PL=2cm; LQ=6cm and PM=1.5 m, then MR in cm is

(a) 0.5 (b) 4.5
(c) 9 (d) 8

(SSC CGL Pre Exam 2016)

372. The length of the radius of a circle with centre 'O' is 5 cm and length of its chord 'AB' is 8 cm. Find the distence between 'O' to 'AB'

(a) 2 cm (b) 3 cm
(c) 4 cm (d) 15 cm

(SSC CGL Pre Exam 2016)

373. The area of a triangle with vertices A (0,8), O (0,0) and B (5, 0) is:

(a) 8 sq. units (b) 13 sq. units
(c) 20 sq. units (d) 40 sq. units

(SSC CGL Pre Exam 2016)

374. In a triangle, the distance of the centroid and three vertices is 4 cm, 6 cm and 8 cm respectively. Then the length of the smallest median is:

(a) 8 (b) 7
(c) 6 (d) 5

(SSC CGL Pre Exam 2016)

375. The ratio of the angles of a triangle is $1:\frac{2}{3}:3$. Then the smallest angle is:

(a) $21\frac{4°}{7}$
(b) 25°
(c) $25\frac{5°}{7}$
(d) $25\frac{5°}{7}$

(SSC CGL Pre Exam 2016)

376. In an isosceles triangle Δ ABC, AB = AC and $\angle$A = 80°. The bisector of $\angle$B and $\angle$C meet at D. The $\angle$BDC is equal to.

(a) 90° (b) 100°
(c) 130° (d) 80°

(SSC CGL Pre Exam 2016)

377. The length of a chord which is at a distance of 12 cm from the centre of a circle of radius 13 cm is

(a) 10 cm (b) 5 cm
(c) 6 cm (d) 12 cm

(SSC CGL Pre Exam 2016)

378. In a triangle ABC, if $\angle$A + $\angle$C = 140° and $\angle$A + 3$\angle$B = 180°, then $\angle$A is equal to

(a) 80° (b) 40°
(c) 60° (d) 20°

(SSC CGL Pre Exam 2016)

379. If PA and PB are two tangents to a circle with centre O such that $\angle$APB = 80°. Then, $\angle$AOP =

(a) 40° (b) 50°
(c) 60° (d) 70°

(SSC CGL Pre Exam 2016)

380. Which of the set of three sides can't form a triangle?

(a) 5 cm, 6 cm, 7 cm
(b) 5 cm, 8 cm, 15 cm
(c) 8 cm, 15 cm, 18 cm
(d) 6 cm, 7 cm, 11 cm

(SSC CGL Pre Exam 2016)

381. AB is the diameter of a circle with centre O and P be a point on its circumference, If $\angle$POA = 120°, then the value of $\angle$PBO is

(a) 30° (b) 60°
(c) 50° (d) 40°

(SSC CGL Pre Exam 2016)

382. An arc of 30° in one circle is double an arc in a second circle, the radius of which is three times the radius of the first. Then the angles subtended by the arc of the second circle at its centre is

(a) 3° (b) 4°
(c) 5° (d) 6°

(SSC CGL Pre Exam 2016)

383. Two circles touch each other externally. The distance between their centres is 7 cm. If the radius of one circle is 4cm, then the radius of the other circle will be

(a) 3 cm (b) 4 cm
(c) 5.5 cm (d) 3.5 cm

(SSC CGL Pre Exam 2016)

384. Let $\triangle$ ABC and $\triangle$ ABD be on the same base AB and between the same parallels AB and CD. Then the relation between areas of triangles ABC and ABD will be

(a) $\triangle ABD = \frac{1}{3} \triangle ABC$

(b) $\triangle ABD = \frac{1}{2} \triangle ABC$

(c) $\triangle ABC = \frac{1}{2} \triangle ABD$

(d) $\triangle ABC = \triangle ABD$

(SSC CGL Pre Exam 2016)

385. Length of the sides of a triangle are a, b and c respectively. If $a^2 + b^2 + c^2 = ab + bc + ca$ then the triangle is

(a) isosceles (b) equilateral
(c) scalene (d) right-angled

(SSC CGL Pre Exam 2016)

386. The orthocentre of a triangle is the point where

(a) the medians meet
(b) the altitudes meet
(c) the right bisectors of the sides of
(d) the bisectors of the angles

(SSC CGL Pre Exam 2016)

387. ABCD is cyclic trapezium in which AD || BC. If $\angle$ABC = 70°, then $\angle$BCD is

(a) 110° (b) 80°
(c) 70° (d) 90°

(SSC CGL Pre Exam 2016)

388. G is the centroid of $\triangle$ABC. If AB = BC = AC, then measure of $\angle$BGC is

(a) 45° (b) 60°
(c) 90° (d) 120°

(SSC CGL Pre Exam 2016)

389. In a circle, a chord, $5\sqrt{2}$ cm long, makes a right angle at the centre. Then the length of the radius of the circle will be

(a) 2.5 cm (b) 5 cm
(c) 7.5 cm (d) 10 cm

(SSC CGL Pre Exam 2016)

390. Number of circles that can be drawn through three non-collinear points are

(a) exactly one (b) two
(c) three (d) more than three

(SSC CGL Pre Exam 2016)

391. Two circle touch each other internally. The radius of the smaller circle is 6cm and the distance between the centre of two circles is 3cm. The radius of the larger cirlce is

(a) 7.5 cm (b) 9 cm
(c) 8 cm (d) 10 cm

(SSC CGL Pre Exam 2016)

392. PQR is an equilateral triangle. MN is drawn parallel to QR such that M is on PQ and N is on PR. If PN=6 cm, then the length of MN is

(a) 3 cm (b) 6 cm
(c) 12 cm (d) 4.5 cm

(SSC CGL Pre Exam 2016)

393. In $\triangle$ABC, DE||AC. Where D and E are two points lying on AB and BC respectively. If AB = 5 cm and AD = 3 cm, then BE : EC is.

(a) 2 : 3 (b) 3 : 2
(c) 5 : 3 (d) 3 : 5

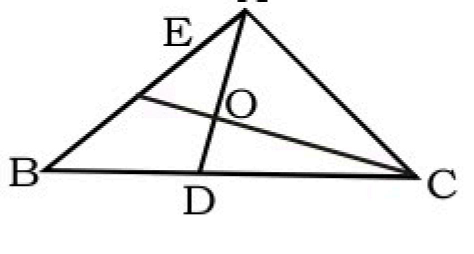
(SSC CGL Pre Exam 2016)

394. PT is a tangent to a circle with centre O and radius 6 cm. If PT is 8 cm then length of OP is

(a) 10 cm (b) 12 cm
(c) 16 cm (d) 9 cm

(SSC CGL Pre Exam 2016)

395. AD and CE are two medians ABC. If EO = 7 cm, then the length of CE is



(a) 28 cm (b) 14 cm
(c) 21 cm (d) 35 cm

(SSC CGL Pre Exam 2016)

396. Three medians AD, BE and CF of $\triangle$ABC intersect at G; area of $\triangle$ABC is 36 sq cm. Then the area of $\triangle$CGE is

(a) 12 sq cm (b) 6 sq cm
(c) 9 sq cm (d) 18 sq cm

(SSC CGL Pre Exam 2016)

397. Possible length of the sides of a triangle are:–

(a) 2 cm, 3 cm, 6 cm
(b) 3 cm, 4 cm, 5 cm
(c) 2.5 cm, 3.5 cm, 6 cm
(d) 4 cm, 4 cm, 9 cm

(SSC CGL Pre Exam 2016)

398. AD is the Median of $\triangle$ABC. If O is the centroid and AO = 10 cm then OD is

(a) 5 cm (b) 20 cm
(c) 10 cm (d) 30 cm

(SSC CGL Pre Exam 2016)

399. Incentre of $\triangle$ABC is I. $\angle$ABC = 90° and $\angle$ACB = 70°. $\angle$BIC is

(a) 115° (b) 100°
(c) 110° (d) 105°

(SSC CGL Pre Exam 2016)

400. The length of the two adjacent sides of a rectangle inscribed in a circle are 5 cm and 12 cm respectively. Then the radius of the circle will be

(a) 6 cm (b) 6.5 cm
(c) 8 cm (d) 8.5 cm

(SSC CGL Pre Exam 2016)

401. In a cyclic quadrilateral ABCD $\angle$BCD = 120° and AB passes through the centre of the circle. Then $\angle$ADB =?

(a) 30° (b) 90°
(c) 50° (d) 60°

(SSC CGL Pre Exam 2016)

402. In an isosceles $\triangle$ABC, AD is the median to the unequal side meeting BC at D. DP is the angle bisector of $\angle$ADB and PQ is drawn parallel to BC meeting AC at Q. Then the measure of $\angle$PDQ is

(a) 130° (b) 90°
(c) 180° (d) 45°

(SSC CGL Pre Exam 2016)

403. A chord of lenght 16 cm is drawn in a circle of radius 10 cm. The distance of the chord from the centre of the circle is

(a) 8cm (b) 6 cm

(c) 4 cm (d) 12 cm

(SSC CGL Pre Exam 2016)

404. If in Δ ABC, DE| |BC, AB = 7.5 cm BD = 6cm and DE = 2cm then the length of BC in cm is:

(a) 6 (b) 8

(c) 10 (d) 10.5

(SSC CGL Pre Exam 2016)

405. Suppose that the medians BD, CE and AF of a triangle ABC meet at G. Then AG : GF is

(a) 1 : 2 (b) 2 : 1

(c) 1 : 3 (d) 2 : 3

(SSC CGL Pre Exam 2016)

406. ABCD is a cyclic trapezium with AB| |CD. If $\angle$A = 105°, then other three angles are

(a) $\angle$B = 75°, $\angle$C=75°, $\angle$D=105°

(b) $\angle$B = 105°, $\angle$C =75°, $\angle$D=75°

(c) $\angle$B=75°, $\angle$C=105°, $\angle$D=75°

(d) $\angle$B=105°, $\angle$C=105°, $\angle$D=75°

(SSC CGL Pre Exam 2016)

407. The ratio of circumradius and inradius of an equilateral triangle is

(a) 1 : 2 (b) 3 : 1

(c) 2 : 1 (d) 1 : 3

(SSC CGL Pre Exam 2016)

408. AB is a diameter of the circle with centre O, CD is chord of the circle, If $\angle$BOC = 120°, then the value of $\angle$ADC is

(a) 42° (b) 30°

(c) 60° (d) 35°

(SSC CGL Pre Exam 2016)

409. The centroid of a triangle is G. If area of ΔABC = 72 sq. unit, then the area of ΔBGC is

(a) 16 sq units (b) 24 sq units

(c) 36 sq units (d) 48 sq units

(SSC CGL Pre Exam 2016)

410. In case of an acute angled triangle, its orthocentre lies

(a) inside the triangle

(b) outside the triangle

(c) on the traingle

(d) on one of the vertex of the triangle

(SSC CGL Pre Exam 2016)

411. If ΔPQR and ΔLMN are similar and 3PQ = LM and MN = 9 cm, then QR is equal to:

(a) 12 cm (b) 6 cm

(c) 9 cm (d) 3 cm

(SSC CGL Pre Exam 2016)

412. AB is a chord of a circle with O as centre. C is a point on the circle such that. OC AB and OC intersects AB at P. If PC = 2 cm and AB = 6 cm then the diameter of the circle is

(a) 6 cm (b) 6.5 cm

(c) 13 cm (d) 12 cm

(SSC CGL Pre Exam 2016)

413. Which of the following is a true statement

(a) Two similar triangles are always congurent

(b) Two similar trinagles have equal areas

(c) Two triangle are similar if their corresponding sides are proportional

(d) Two polygons are similar if their corresponding sides are proportional

(SSC CGL Pre Exam 2016)

414. In a triangle ABC, OB and OC are the bisectors of angles $\angle$B and $\angle$C respectively. $\angle$BAC = 60·. Then the angle $\angle$BOC will be

(a) 150° (b) 120°

(c) 100° (d) 90°

(SSC CGL Pre Exam 2016)

415. If the difference between the measures of the two smaller angles of a right angled triangle is 8°, then the smallest angle is

(a) 37° (b) 41°

(c) 42° (d) 49°

(SSC CGL Pre Exam 2016)

416. Let O be the orthocentre of the triangle ABC. If $\angle$BOC = 150° Then $\angle$BAC is

(a) 30° (b) 60°

(c) 90° (d) 120°

(SSC CGL Pre Exam 2016)

417. Three sides of a triangle are 5 cm, 9 cm and x cm. The minimum integral value of x is

(a) 2 (b) 3

(c) 4 (d) 6

(SSC CGL Pre Exam 2016)

418. If the measure of the angles of a triangle are in the ratio 1 : 2 : 3 and if the length of the smallest side of the triangle is 10 cm., then the length of the longest side is

(a) 20 cm (b) 25 cm

(c) 30 cm (d) 35 cm

(SSC CGL Pre Exam 2016)

419. An exterior angle of a triangle is 115° and one of the interior opposite angle is 45°. Then the other two angles are

(a) 65°, 70° (b) 60°, 75°

(c) 45°, 90° (d) 50°, 85°

(SSC CGL Pre Exam 2016)

420. In a ΔABC, $\angle$A + $\angle$B = 75° and $\angle$B + $\angle$C = 140°, then $\angle$B is

(a) 40° (b) 35°

(c) 50° (d) 45°

(SSC CGL Pre Exam 2016)

421. ΔABC is similar to ΔDEF is area of ΔABC is 9 sq.cm. and area of ΔDEF is 16 sq.cm. and BC = 21 cm. Then the length of EF will be

(a) 5.6 cm (b) 2.8 cm

(c) 3.7 cm (d) 1.4 cm

(SSC CGL Mains Exam 2016)

422. A chord of a circle is equal to its radius. The angle subtended by this chord at a point on the circumference is

(a) 80° (b) 90°

(c) 60° (d) 30°

(SSC CGL Mains Exam 2016)

423. Let two chords AB and AC of the larger circle touch the smaller circle having same centre at X and Y. Then XY = ?

(a) BC (b) $\frac{1}{2}$ BC

(c) $\frac{1}{3}$ BC (d) $\frac{1}{4}$ BC

(SSC CGL Mains Exam 2016)

424. Let G be the centroid of the equilateral triangle ABC of permeter 24cm . Then the length of AG is

(a) $2\sqrt{3}$ cm (b) $2\sqrt{3}$ cm

(c) $8/\sqrt{3}$ cm (d) $4\sqrt{3}$ cm

(SSC CGL Mains Exam 2016)

425. A and B are the centres of two circles with radil 11 cm and 6 cm respectively . A common tangent touches these circles at P & Q respectively .If AB = 13cm, then the length of PQ is

(a) 13 cm (b) 17 cm

(c) 8.5 cm (d) 12 cm

(SSC CGL Mains Exam 2016)

426. ABC is an isosceles triangle inscribed in a circle . If AB = AC = $12\sqrt{5}$ and BC = 24 cm then radius of circle is

(a) 10 cm (b) 15 cm

(c) 12 cm (d) 14 cm

(SSC CGL Mains Exam 2016)

427. ABC is an isosceles triangle where AB = AC which is circumscribed about a circle. If P is the point where the circle touches the side BC, then which of the following is true ?

(a) BP = PC (b) BP > PC

(c) BP < PC (d) BP = $\frac{1}{2}$ PC

(SSC CGL Mains Exam 2016)

428. If D and E are the mid points of AB and AC respectively of ΔABC, then the ratio of the areas of $\triangle$ ADE and □BCED is ?

(a) 1 : 2 (b) 2 : 3

(c) 1 : 4 (d) 1 : 3

(SSC CGL Mains Exam 2016)

429. O is the circumcentre of the isosceles ΔABC . Given that AB = AC = 17 cm and BC = 6 cm The radius of the circle is

(a) 3.015 cm (b) 3.205 cm

(c) 3.025 cm (d) 3.125 cm

(SSC CGL Mains Exam 2016)

430. B_1 is a point on the side AC of ΔABC and B_1B is joined . A line is drawn through A parallel to B_1B meeting BC at A_1 and another line is drawn through C parllel to B_1B meeting AB produced at C_1. Then

(a) $\frac{1}{CC_1} - \frac{1}{AA_1} = \frac{1}{BB_1}$

(b) $\frac{1}{CC_1} + \frac{1}{AA_1} = \frac{1}{BB_1}$

(c) $\frac{1}{BB_1} - \frac{1}{AA_1} = \frac{1}{CC_1}$

(d) $\frac{1}{BB_1} + \frac{1}{AA_1} = \frac{1}{CC_1}$

(SSC CGL Mains Exam 2016)

431. ABCD is a cyclic quadrilateral of the which AB is the diameter. Diagonals AC and BD intersect at E. If ∠DBC = 35°, Then ∠AED measures

(a) 35° (b) 45°

(c) 55° (d) 90°

(SSC CGL Mains Exam 2016)

432. In a triangle ABC, ∠A = 70°, ∠B = 80° and D is the incentre of $\triangle$ ABC ∠ACB = 2x° and ∠BDC = y°. The values of x and y, respectively are

(a) 15, 130 (b) 15, 125

(c) 35, 40 (d) 30, 150

(SSC CGL Mains Exam 2016)

433. In a right angled triangle $\triangle$ DEF, if the length of the hypotenuse EF is 12 cm, then the length of the median DX is

(a) 3 cm (b) 4 cm

(c) 6 cm (d) 12 cm

(SSC CGL Mains Exam 2016)

434. Two equal circles intersect so that there centres, and the point at which they intersect from a square of side 1 cm. The area (in sq.cm) of the portion that is common to the circles is

(SSC CGL Mains Exam 2016)

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2} - 1$

(c) $\frac{\pi}{5}$ (d) $\left(\sqrt{2} - 1\right)$

(SSC CGL Mains Exam 2016)

435. PQRA is a rectangle, AP = 22 cm, PQ = 8 cm. $\triangle$ ABC is a triangle whose vertices lie on the sides of PQRA such that BQ = 2 cm and QC = 16 cm. Then the length of the line joining the mid points of the sides AB and BC is

(a) $4\sqrt{2}$ cm (b) 5 cm

(c) 6 cm (d) 10 cm

(SSC CGL Mains Exam 2016)

436. ABC is an isosceles right angle triangles having ∠C = 90°. If D is any point on AB, then $AD^2 + BD^2$ is equal to

(a) CD^2 (b) $2CD^2$

(c) $3CD^2$ (d) $4CD^2$

(SSC CGL Mains Exam 2016)

437. D and E are points on the sides AB and AC respectively of $\triangle$ ABC such that DE is parallel to BC and AD : DB = 4 : 5, CD and BE intersect each other at F. The ratio of the areas of $\triangle$ DEF and $\triangle$ CBF

(a) 16 : 25 (b) 16 : 81

(c) 81 : 16 (d) 4 : 9

(SSC CGL Mains Exam 2016)

438. Diagonals of a Trapezium ABCD with AB||CD intersect each other at the point O. If AB = 2CD, then the ratio of the areas of $\triangle$ AOB and $\triangle$ COD is

(a) 4 : 1 (b) 1 : 16

(c) 1 : 4 (d) 16 : 1

(SSC CGL Mains Exam 2016)

439. If O is the orthocentre of triangle ABC and ∠BOC = 100°, the measure of BAC is

(a) 80° (b) 180°

(c) 100° (d) 200°

(SSC CGL Mains Exam 2016)

440. PQ and RS are common tangents to two circles intersecting at A and B. AB when produced both sides, meet the tangents PQ and RS at X and Y, respectively. If AB = 3 cm, XY = 5 cm, then PQ (in cm) will be

(a) 3 cm (b) 4 cm

(c) 5 cm (d) 2 cm

(SSC CGL Mains Exam 2016)

441. In an equilateral triangle ABC, G is the centroid. Each side of the triangle is 6 cm. The length of AG is

(a) $2\sqrt{2}$ cm (b) $3\sqrt{2}$ cm

(c) $2\sqrt{3}$ cm (d) $3\sqrt{3}$ cm

(SSC CGL Mains Exam 2016)

442. PQ is a tangent to the circle at T. If TR = TS where R and S are points on the circle and ∠RST = 65°, the ∠PTS =

(a) 65° (b) 130°

(c) 115° (d) 55°

(SSC CGL Mains Exam 2016)

443. In $\triangle ABC$, AC = BC and $\angle ABC = 50°$, the side BC is produced to D so that BC = CD then the value of $\angle BAD$

(a) 80° (b) 40°

(c) 90° (d) 50°

(SSC CGL Mains Exam 2016)

444. In a circle, a diameter AB and a chord PQ (which is not a diameter) intersect each other X perpendicularly. If AX : BX = 3 : 2 and the radius of the circle is 5 cm, then the length of chord PQ is

(a) $2\sqrt{13}$ cm (b) $5\sqrt{3}$ cm

(c) $4\sqrt{6}$ cm (d) $4\sqrt{5}$ cm

(SSC CGL Mains Exam 2016)

445. ABC is a triangle, PQ is line segment intersecting AB in P and AC in Q and PQ II BC. The ratio of AP : BP = 3 : 5 and length of PQ is 18 cm. The length of BC is

(a) 28 cm (b) 48 cm

(c) 84 cm (d) 42 cm

(SSC CGL Mains Exam 2016)

446. If the parallel sides of a trapezium are 8 cm and 4 cm, M and N are the mid points of the diagonals of the trapezium, then length of MN is

(a) 12 cm (b) 6cm

(c) 1cm (d) 2 cm

(SSC CGL Mains Exam 2016)

447. $\triangle ABC$ is isosceles having AB = AC and $\angle A = 40°$. Bisectors PO and OQ of the exterior angles $\angle ABD$ and $\angle ACE$ formed by producing BC on both sides, meet at O. Then the value of $\angle BOC$ is

(a) 70° (b) 110°

(c) 80° (d) 55°

(SSC CGL Mains Exam 2016)

448. An equilateral triangle of side 6 cm is incribed in a circle. Then radius of the circle is

(a) $2\sqrt{3}$ cm (b) $3\sqrt{2}$ cm

(c) $4\sqrt{3}$ cm (d) $\sqrt{3}$ cm

(SSC CGL Mains Exam 2016)

449. In a circle with centre O, AB is a diameter and CD is a chord which is equal to the radius OC. AC and BD are extended in such a way that they intersect each other at a point P, exterior to the circle. The measure of $\angle APB$ is

(a) 30° (b) 45°

(c) 60° (d) 90°

(SSC CGL Mains Exam 2016)

450. Two chords AB and CD of a circle with centre O intersect at P. If $\angle APC = 40°$. Then the value of $\angle AOC + \angle BOD$ is

(a) 50° (b) 60°

(c) 80° (d) 120°

(SSC CGL Mains Exam 2016)

ANSWER KEY

1. (b)	46. (c)	91. (b)	136.(d)	181.(d)	226.(a)	271.(a)	316.(c)	361.(a)	406.(c)
2. (b)	47. (c)	92. (c)	137.(b)	182.(c)	227.(b)	272.(a)	317.(b)	362.(c)	407.(c)
3. (c)	48. (b)	93. (b)	138.(b)	183.(c)	228.(c)	273.(c)	318.(c)	363.(b)	408.(b)
4. (c)	49. (c)	94. (b)	139.(d)	184.(a)	229.(d)	274.(b)	319.(b)	364.(c)	409.(b)
5. (a)	50. (d)	95. (b)	140.(d)	185.(a)	230.(b)	275.(c)	320.(a)	365.(a)	410.(a)
6. (b)	51. (b)	96. (c)	141.(d)	186.(d)	231.(b)	276.(c)	321.(b)	366.(a)	411.(d)
7. (a)	52. (b)	97. (a)	142.(b)	187.(b)	232.(c)	277.(d)	322.(d)	367.(b)	412.(b)
8. (b)	53. (b)	98. (a)	143.(d)	188.(b)	233.(a)	278.(a)	323.(d)	368.(c)	413.(c)
9. (d)	54. (b)	99. (d)	144.(d)	189.(a)	234.(a)	279.(c)	324.(a)	369.(d)	414.(b)
10. (c)	55. (d)	100.(d)	145.(a)	190.(a)	235.(d)	280.(d)	325.(c)	370 .(d)	415.(b)
11. (c)	56. (b)	101.(c)	146.(d)	191.(c)	236.(c)	281.(a)	326.(c)	371.(b)	416.(a)
12. (c)	57. (b)	102.(b)	147.(b)	192.(c)	237.(b)	282.(b)	327.(a)	372.(b)	417.(d)
13. (b)	58. (b)	103.(c)	148.(a)	193.(b)	238.(a)	283.(b)	328.(a)	373.(c)	418.(a)
14. (a)	59. (b)	104.(b)	149.(c)	194.(b)	239.(a)	284.(a)	329.(c)	374.(c)	419.(a)
15. (b)	60. (b)	105.(c)	150.(c)	195.(c)	240.(d)	285.(b)	330.(b)	375.(d)	420.(b)
16. (a)	61. (d)	106.(b)	151.(b)	196.(b)	241.(b)	286.(c)	331.(a)	376.(c)	421.(b)
17. (b)	62. (c)	107.(a)	152.(d)	197.(b)	242.(b)	287.(d)	332.(d)	377.(a)	422.(d)
18. (b)	63. (d)	108.(a)	153.(d)	198.(a)	243.(c)	288.(d)	333.(a)	378.(c)	423.(b)
19. (b)	64. (a)	109.(a)	154.(d)	199.(c)	244.(d)	289.(a)	334.(d)	379.(b)	424.(c)
20. (b)	65. (d)	110.(b)	155.(c)	200.(c)	245.(a)	290.(a)	335.(a)	380.(b)	425.(d)
21. (d)	66. (b)	111.(c)	156.(b)	201.(a)	246.(d)	291.(c)	336.(b)	381.(b)	426.(b)
22. (c)	67. (b)	112.(a)	157.(b)	202.(d)	247.(d)	292.(b)	337.(b)	382.(c)	427.(a)
23. (a)	68. (b)	113.(c)	158.(a)	203.(c)	248.(a)	293.(a)	338.(c)	383.(a)	428.(d)
24. (b)	69. (b)	114.(c)	159.(d)	204.(c)	249.(c)	294.(c)	339.(d)	384.(d)	429.(d)
25. (c)	70. (b)	115.(a)	160.(d)	205.(c)	250.(a)	295.(a)	340.(b)	385.(b)	430.(b)
26. (d)	71. (b)	116.(a)	161.(b)	206.(a)	251.(d)	296.(b)	341.(d)	386.(b)	431.(c)
27. (a)	72. (b)	117.(a)	162.(d)	207.(b)	252.(a)	297.(b)	342.(d)	387.(c)	432.(b)
28. (a)	73. (a)	118.(d)	163.(d)	208.(b)	253.(c)	298.(b)	343.(b)	388.(d)	433.(c)
29. (d)	74. (d)	119.(a)	164.(c)	209.(c)	254.(c)	299.(a)	344.(d)	389.(b)	434.(b)
30. (a)	75. (b)	120.(d)	165.(d)	210.(b)	255.(b)	300.(a)	345.(c)	390.(a)	435.(b)
31. (a)	76. (a)	121.(b)	166.(d)	211.(b)	256.(c)	301.(b)	346.(a)	391.(b)	436.(b)
32. (c)	77. (a)	122.(a)	167.(c)	212.(d)	257.(c)	302.(b)	347.(a)	392.(b)	437.(b)
33. (c)	78. (d)	123.(b)	168.(d)	213.(b)	258.(a)	303.(d)	348.(d)	393.(a)	438.(a)
34. (c)	79. (a)	124.(a)	169.(c)	214.(d)	259.(d)	304.(c)	349.(b)	394.(a)	439.(a)
35. (a)	80. (b)	125.(c)	170.(c)	215.(d)	260.(a)	305.(c)	350.(c)	395.(c)	440.(b)
36. (b)	81. (b)	126.(b)	171.(a)	216.(b)	261.(b)	306.(a)	351.(c)	396.(c)	441.(c)
37. (d)	82. (b)	127.(a)	172.(d)	217.(c)	262.(a)	307.(b)	352.(a)	397.(b)	442.(c)
38. (c)	83. (c)	128.(b)	173.(d)	218.(c)	263.(b)	308.(b)	353.(a)	398.(a)	443.(c)
39. (c)	84. (b)	129.(c)	174.(c)	219.(a)	264.(d)	309.(b)	354.(b)	399.(b)	444.(c)
40. (c)	85. (b)	130.(c)	175.(c)	220.(b)	265.(c)	310.(d)	355.(c)	400.(b)	445.(b)
41. (b)	86. (c)	131.(d)	176.(b)	221.(d)	266.(d)	311.(c)	356.(c)	401.(b)	446.(d)
42. (c)	87. (c)	132.(a)	177.(d)	222.(a)	267.(b)	312.(b)	357.(d)	402.(b)	447.(a)
43. (b)	88. (d)	133.(a)	178.(c)	223.(a)	268.(b)	313.(a)	358.(d)	403.(b)	448.(a)
44. (d)	89. (c)	134.(d)	179.(a)	224.(d)	269.(d)	314.(c)	359.(d)	404.(c)	449.(c)
45. (b)	90. (d)	135.(b)	180.(d)	225.(d)	270.(c)	315.(a)	360.(a)	405.(b)	450.(c)

EXPLANATION

1. (b) According to question
Angle of measure = 45° 27'

$= 45° + \frac{27}{60}$

Asked to draw an angle = 45°

Error = $45° + \frac{27}{60} - 45° = \frac{27}{60}$

Error % $= \frac{\left(\frac{27}{60}\right)}{45} \times 100$

$= \frac{27}{60 \times 45} \times 100 = 1.0\%$

2. (b) According to question,

$\frac{\text{Exterior angle}}{\text{Interior angle}} = \frac{1}{4} = \frac{x}{4x}$

As we know that,
Interior angle + Exterior angle = 180°
Exterior angle

$= \frac{360°}{\text{No. of sides}}$

$\therefore x + 4x = 180°$
$5x = 180°$
$x = 36°$

$\therefore$ No. of sides

$= \frac{360°}{\text{Exterior angle}}$

No. of sides $= \frac{360^0}{36^0} = 10$

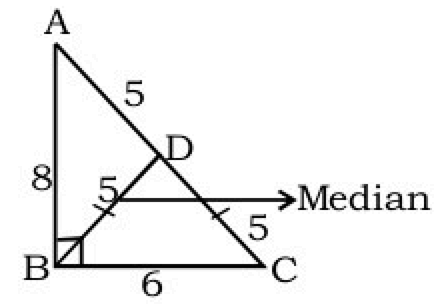
No. of sides = 10

3. (c) According to questions,
Let sides of the triangle be $3x$, $4x$, $6x$
Now check the square of biggest side and sum of square of two smallest side and check which is greater

$\therefore (3x)^2 + (4x)^2 < (6x)^2 \Rightarrow 25x^2 < 36x^2$

$\therefore$ The triangle will be obtuse angled triangle.

4. (c) According to question,
Length of the three sides of a triangle are 6 cm, 8 cm and 10 cm, this is right angle triangle.



Note: In right angle triangle median divides the hypotenuse in two equal parts

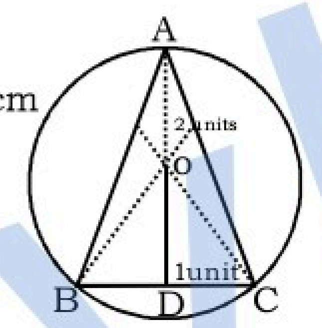
$\therefore BD = \frac{H}{2}$

$BD = \frac{10}{2}$

BD = 5 cm

5. (a) According to question
Circumradius of an equilateral triangle
$I_R = 10$ cm

$AO = I_R = 10$ cm
$DO = I_r = ?$



2 units $\rightarrow$ 10 cm
1 unit $\rightarrow$ 5 cm
$\therefore DO = I_r = 5$ cm

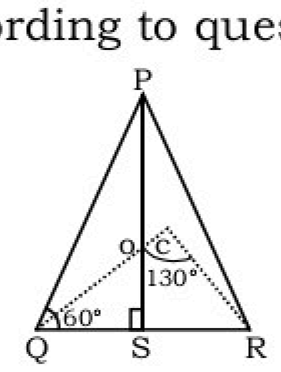
Alternate

In equilateral triangle,

$R_{in} = \frac{r_c}{2}$

$R_{in} = \frac{10}{2} = 5$ cm

6. (b) According to question,



Given $\angle PQS = 60°$

$\angle QCR = 130°$

$\therefore \angle QPR = \frac{1}{2}\angle QCR$

$\angle QPR = \frac{1}{2} \times 130° = 65°$

Now, $\angle PQS + \angle PSQ + \angle QPS = 180°$

$60° + 90° + \angle QPS = 180°$

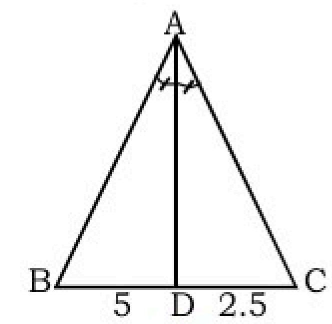
$\angle QPS = 30°$

$\angle RPS = \angle QPR - \angle QPS$

$= 65° - 30°$

$\angle RPS = 35°$

7. (a) According to question,



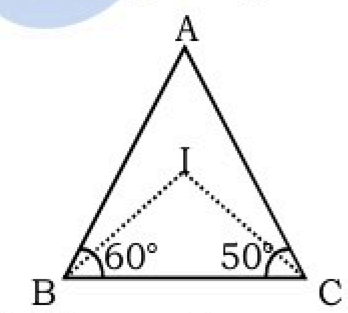
By internal bisector property

$\frac{AB}{AC} = \frac{BD}{DC}$

$\frac{AB}{AC} = \frac{5}{2.5} = \frac{2}{1}$

$\therefore \frac{AB}{AC} = \frac{\mathbf{2}}{\mathbf{1}}$

8. (b) According to question,



BI and CI are the angle bisector

$\therefore \angle CBI = 30°$

$\angle BCI = 25°$

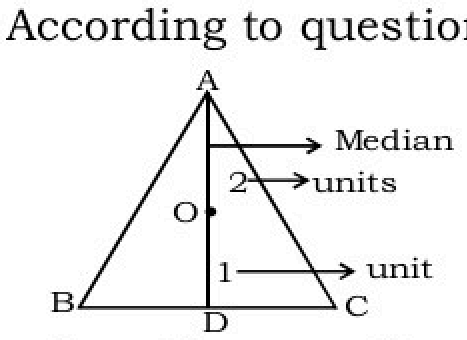
In $\triangle$ BIC

$\angle CBI + \angle BCI + \angle BIC = 180°$

$30° + 25° + \angle BIC = 180°$

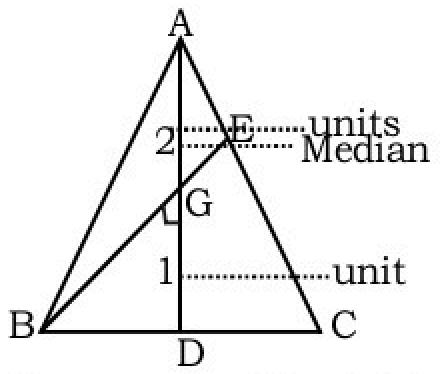
$\angle BIC = 125°$

9. (d) According to question,



$AO = I_R$ = Circumradius
$DO = I_r$ = Inradius = 3 cm
Median AD = 3 units
1 unit = 3 cm
3 units = 3 × 3 = 9 cm
$\therefore$ AD = 9 cm

10. (c) According to question,



G is the centroid which divides the median in 2 : 1

$\therefore$ AD = 3 units = 9 cm

3 units = 9 cm

1 unit = $\frac{9}{3}$ = 3 cm

$\therefore$ GD = 3 cm

BE = 3 units = 6 cm

3 units = 6 cm

1 unit = $\frac{6}{3}$

2 units = $\frac{6}{3} \times 2$ = 4 cm

$\therefore$ BG = 4 cm

$\triangle$ BGD is a right angle triangle

$BD^2 = BG^2 + GD^2$

$BD^2 = (4)^2 + (3)^2$

$BD^2 = 16 + 9$

BD = $\sqrt{25}$

BD = 5 cm

11. (c) According to question,

Given:

Interior angle – Exterior angle = 150° ....(i)

We know

Interior angle + Exterior angle = 180° ....(ii)

Solve equation (i) and (ii)

Interior angle = 165°

Exterior angle = 15°

$\therefore$ no. of sides= $\frac{360°}{\textit{Exterior angle}}$

$= \frac{360°}{15°} = 24$

12. (c) According to question,

Given:

Interior angle = 144°

Exterior angle = 180° – 144° = 36°

$\therefore$ no. of sides = $\frac{360°}{\textit{Exterior angle}}$

$= \frac{360°}{36°} = 10$

13. (b) According to question,

Sum of interior angles

= (n – 2) × 180°

Given: Sum of interior angle = 1080°

(n – 2) × 180° = 1080°

(n – 2) = $\frac{1080°}{180}$

(n – 2) = 6

n = 6 + 2 = 8

No. of sides n = 8

14 (a) Let the no. of sides is $5x$ and $4x$

According to questions,

$$\left(180° - \frac{360°}{5x}\right) - \left(180° - \frac{360°}{4x}\right) = 6°$$

$$180° - \frac{360°}{5x} - 180° + \frac{360°}{4x} = 6°$$

$$\frac{360°}{4x} - \frac{360°}{5x} = 6°$$

$$360°\left(\frac{1}{4x} - \frac{1}{5x}\right) = 6°$$

$$\frac{1}{20x} = \frac{1}{60}, \quad x = 3$$

No. of sides are $5x$ and $4x$

= 15, 12

15. (b) According to question,

Given:

Internal Angle = 2 (External Angle)

As we know that,

Internal Angle + External Angle = 180°

$\therefore$ 2 External Angle + External Angle = 180°

3 External Angle = 180°

External Angle = $\frac{180°}{3}$ = 60°

No. of sides = $\frac{360°}{\textit{External angle}}$

$= \frac{360°}{60°}$ = 6 (no. of sides)

16 (a) Let the number of sides be $5x$ and $6x$

As we know that

Each interior angle

$$= \frac{(2n-4) \times 90°}{n}$$

Given: $\frac{n_1}{n_2} = \frac{5x}{6x}$

$$\frac{\text{Interior angle}_1}{\text{Interior angle}_2} = \frac{24}{25}$$

$\therefore$ Using Interior angle formula

$$\frac{\frac{(n_1-2)180°}{n_1}}{\frac{(n_2-2)180°}{n_2}} = \frac{24}{25}$$

$$\frac{\frac{5x-2}{5x}}{\frac{6x-2}{6x}} = \frac{24}{25}$$

$x = 2$

Then, No. of sides

= 5 × 2 = 10,

6 × 2 = 12

= 10, 12

17. (b) According to question,

$n \rightarrow$ No. of sides

Interior angle

$$= \frac{(2n-4) \times 90}{n} = 180 - \frac{360}{n}$$

(a) $150° = 180° - \frac{360°}{n}$

$\frac{360°}{n} = 30°$

n = 12

(b) $105° = 180° - \frac{360°}{n}$

$\frac{360°}{n} = 75°$

n = $\frac{24}{5}$

(c) $108° = 180° - \frac{360°}{n}$

$\frac{360°}{n} = 72°$

n = 5

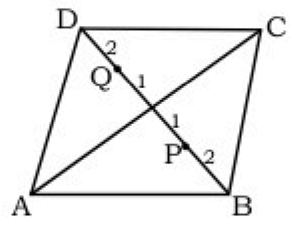
(d) $144° = 180° - \frac{360°}{n}$

$\frac{360°}{n} = 36°$

n = 10

$\therefore$ Only 105° angle which can never be interior angle of regular polygon

18. (b) According to question,



Given: BD = 18 cm

Note: Centroid is the point where medians intersects and it divides median in 2 : 1

BD = 6 units, PQ = 2 units

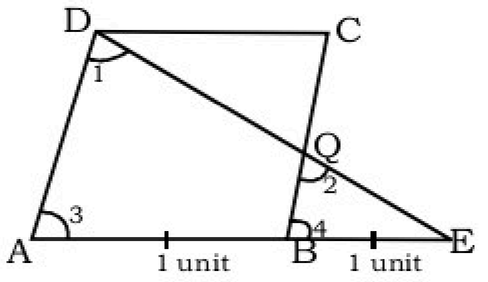
6 units = 18 cm

1 unit = $\frac{18}{6}$ = 3

2 units = 3 × 2 = 6

∴ PQ = 6 cm

19. (b) According to questions,



AD | | BC and AB | | DC

Point B is the midpoint of AE

$\angle 1 = \angle 2$ (Corresponding alternate angle)

$\angle 3 = \angle 4$ (Corresponding alternate angle)

$\therefore \quad \Delta EQB \sim \Delta EDA$

$\therefore \quad \frac{EB}{EA} = \frac{EQ}{ED} = \frac{QB}{AD}$

$\frac{1}{2} = \frac{QB}{AD}$

$\frac{QB}{AD} = \frac{1}{2}$

If AD = 2

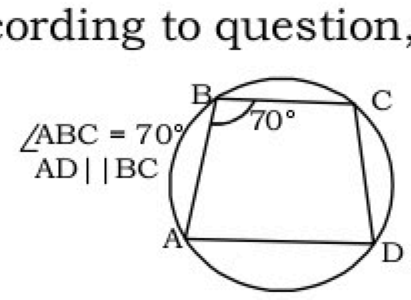
QB = 1

Then QC = 1

∴ Q divides BC in the ratio (1:1)

20. (b) According to question,

Given:



$\therefore \quad \angle BAD$ = 180 – 70° = 110°

(∴ sume of interior angles between two parallel line is 180°)

∠BCD = 180 – 110° = 70°

Note: In trapezium sum of opposite angles are 180°:

Alternate

In cyclic trapezium,

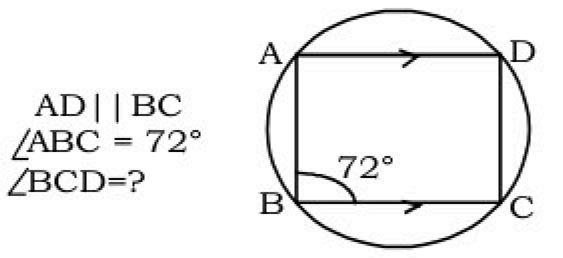
∠A = ∠D

and ∠B = ∠C

∴ ∠BCD = ∠ABC = 70°

21. (d) According to question

Given:



$\angle ABC + \angle CDA$ = 180°

$\angle CDA$ = 180 – 72 = 108°

AD | | BC

$\therefore \quad \angle ADC + \angle BCD$ = 180°

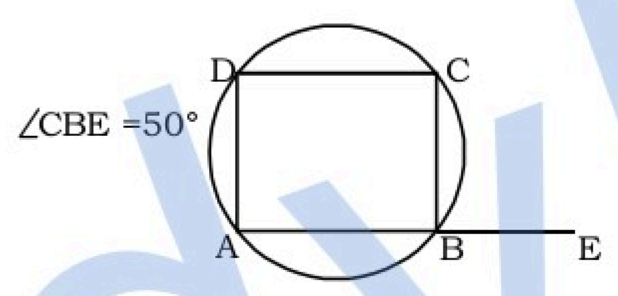
(∴ Sum of corresponding angle of parallel line is 180°)

$\angle BCD$ = 180° – 108°

$\angle BCD$ = 72°

22. (c) According to question,

Given:



$\angle ABC + \angle CBE$ = 180°

$\angle ABC$ = 180° – 50°

$\angle ABC$ = 130°

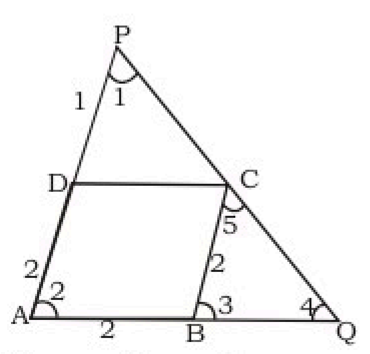
In cyclic quadrilateral sum of opposite angles is 180°

$\angle CDA$ = 180° – 130°

$\angle CDA$ = 50°

23. (a) According to question,

Given:



ABCD is a rhombus

AB = BC= CD =DA

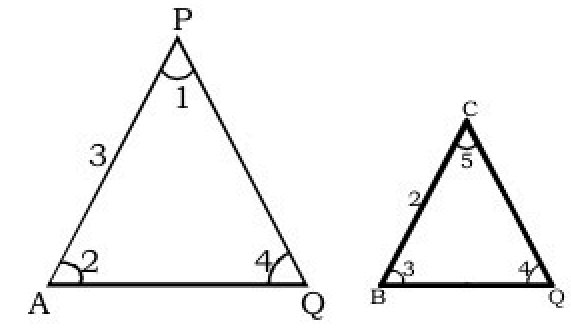
DP = $\frac{1}{2}$AB

$\frac{DP}{AB} = \frac{1}{2}$

In a rhombus $\angle 2 = \angle 3$

$\therefore \quad \Delta APQ \sim \Delta BCQ$

(∵ ∠Q IS COMMON AND $\angle 2 = \angle 3$



$\frac{AP}{BC} = \frac{AQ}{BQ}$ $\qquad \frac{AQ}{BQ} = \frac{3}{2}$

$\frac{AB + BQ}{BQ} = \frac{3}{2}$ (∴ AQ = AB + BQ)

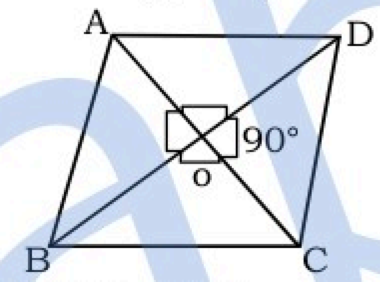
$\frac{AB}{BQ} + 1 = \frac{3}{2}$

$\frac{AB}{BQ} = \frac{3}{2} - 1$

$\frac{AB}{BQ} = \frac{1}{2}$

$\therefore \frac{BQ}{AB} = \frac{2}{1}$

24. (b) According to question



$OB^2 + OC^2 = BC^2$ ....(i)

$OB^2 + OA^2 = AB^2$ ....(ii)

$OA^2 + OD^2 = AD^2$ ....(iii) [By pythagoras theorem]

$OC^2 + OD^2 = CD^2$.........(iv)

Add equations (i),(ii),(iii) and (iv)

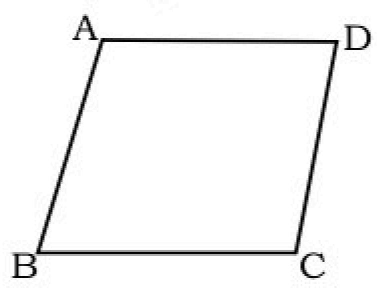
$2(OB^2 + OC^2 + OD^2 + OA^2) = BC^2 + AB^2 + AD^2 + CD^2$

$2BC^2 + 2AD^2 = BC^2 + AB^2 + AD^2 + CD^2$

$BC^2 + AD^2 = AB^2 + CD^2$

or $AB^2 + CD^2 = BC^2 + DA^2$

25. (c) According to question.



Given:

Ratio of $\angle A$ and $\angle B$ is 4 : 5

$\frac{\angle A}{\angle B} = \frac{4}{5}$

We know that, $\angle A + \angle B$ = 180°

9 units = 180°

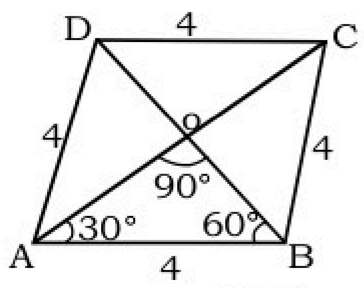
1 unit = 20

∠A = 4 units = 4 × 20° = 80°

∠A = ∠C = 80°

[Opposite ∠ of rhombus are equal]

26. (d) According to question,



Given : $\angle B = 120°$

In a rhombus diagonal are angle bisector and diagonal cut at right angle.

$\therefore \quad \text{Sin}30° = \frac{P}{H} = \frac{BO}{AB}$

$\frac{1}{2} = \frac{BO}{4}$

BO = 2 cm

$\therefore \quad BD = 2 \times BO$

$= 2 \times 2 = 4$ cm

Alternate:-

$\angle ABD = \frac{1}{2} \angle ABC$

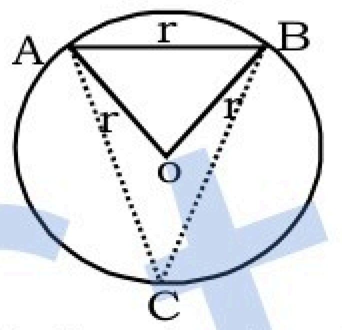
$= \frac{1}{2} \times 120° = 60°$

$\therefore \angle A = \angle ABD = \angle ADB = 60°$

$\therefore \Delta ABD$ = equilateral triangle

So, AB = BD = 4 cm

27. (a) According to question



Let AB is the chord and 'O' is the centre of circle

Given : The length of AB is equal to radius

$\therefore$ OA = OB = AB = r

$\therefore \Delta AOB$ is an equilateral triangle

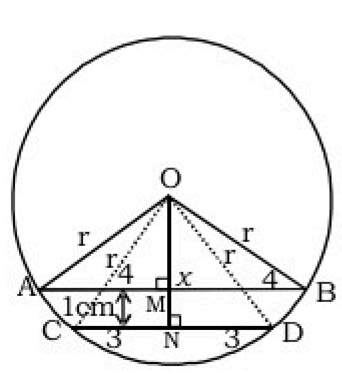
$\angle AOB = 60°$

$\therefore \angle ACB$ which chord subtends in the major segment is

$= \frac{60°}{2} = 30°$

28. (a) According to question,

Given:



AB and CD are chords

AB = 8 cm

Let ON = x cm

$\therefore$ In, ΔOMA

$OA^2 = OM^2 + AM^2$

$r^2 = (x-1)^2 + (4)^2$

$r^2 = (x-1)^2 + 16$.........(i)

In ΔOND

$OD^2 = ON^2 + ND^2$

$r^2 = x^2 + (3)^2$

$r^2 = x^2 + 9$.................(ii)

Comparing equations (i) and (ii)

$(x-1)^2 + 16 = x^2 + 9$

$x^2 + 1 - 2x + 16 = x^2 + 9$

$17 - 2x = 9$

$2x = 8$

$x = 4$

Put the value of 'x' in equation (ii)

$r^2 = (4)^2 + 9$

$r^2 = 16 + 9$

$r^2 = 25$

r = 5 cm

Alternate

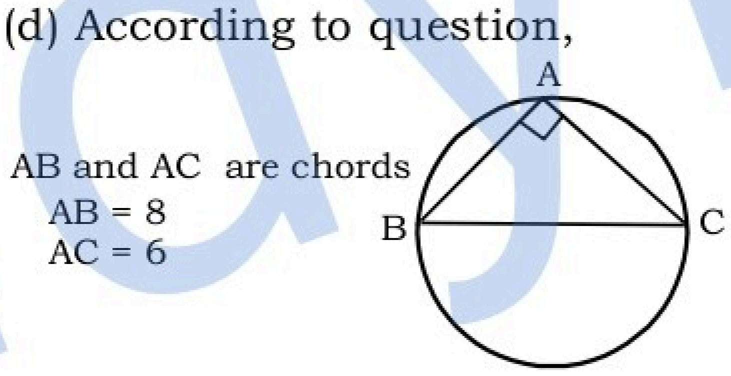
AM = 4 cm

CN = 3 cm

{3,4,5 } = formed a triplet

$\therefore$ Radius = 5 cm

29. (d) According to question,



In ΔBAC

$\angle A = 90°$

$\therefore BC^2 = AB^2 + AC^2$

$BC^2 = 8^2 + 6^2$

$BC^2 = 64 + 36$

$BC^2 = 100$

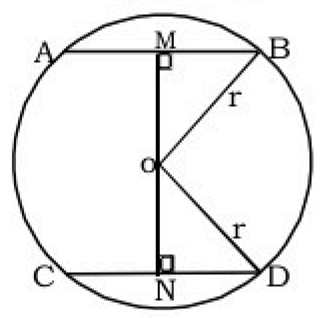
BC = 10 cm

Here BC is the diameter of a circle because angle subtended on the arc of semi circle is 90°

$\therefore \quad \frac{BC}{2} = \text{radius} = \frac{10}{2} = 5$ cm

30. (a) According to question

Given:



AB = CD = 8 cm

r = 5 cm

$\therefore$ In ΔOMB

$OB^2 = OM^2 + MB^2$

$r^2 = OM^2 + (4)^2$

$(5)^2 = OM^2 + 16$

$25 - 16 = OM^2$

$OM^2 = 25 - 16$

$OM^2 = 9$

OM = 3

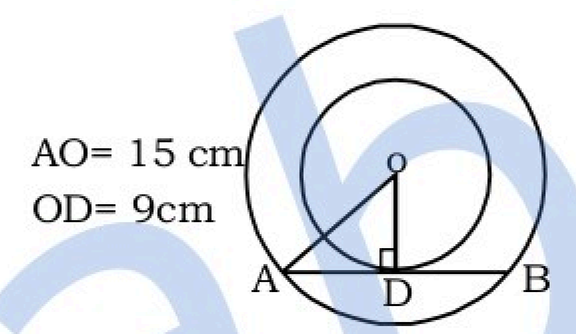
$\therefore MN = 2 \times OM$

$MN = 2 \times 3 = 6$ cm

31. (a) According to question,

Let 'O' be the centre of circle and 'AB' is the chord of the biggest circle

$\therefore$



$\therefore$ In ΔODA

$OA^2 = OD^2 + AD^2$

$(15)^2 = (9)^2 + AD^2$

$AD^2 = 225 - 81$

$AD^2 = 144$

AD = 12 cm

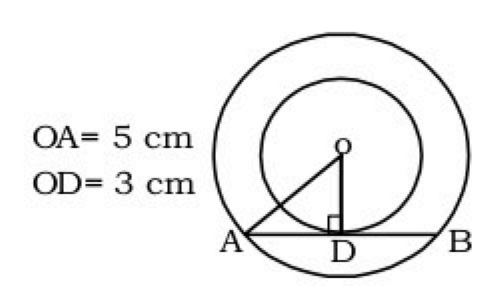
$\therefore AB = 2 \times AD$

$AB = 2 \times 12 = 24$ cm

32. (c) According to question

Let 'AB' is the chord of biggest circle and 'O' be the centre of a circle

$\therefore$



$\therefore$ In ΔODA

$OA^2 = OD^2 + AD^2$

$(5)^2 = (3)^2 + AD^2$

$AD^2 = 25 - 9$

$AD^2 = 16$

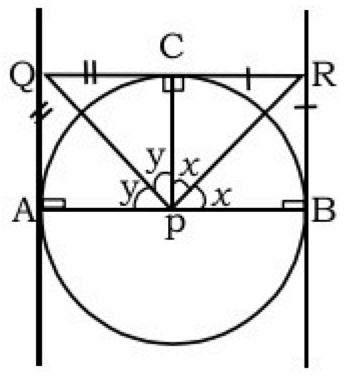
AD = 4 cm

$\therefore AB = 2 \times AD$

$= 2 \times 4$

AB = 8 cm

33. (c) According to question



In $\triangle PCR$ and $\triangle RBP$

PC = PB (radius)

RC = RB

PR is common

$\therefore \quad \triangle PCR \cong \triangle RBP$

similarly, $\triangle$ PCQ ~ $\triangle$ QAP

$\angle CPR = \angle RPB = x$ (CPCT)

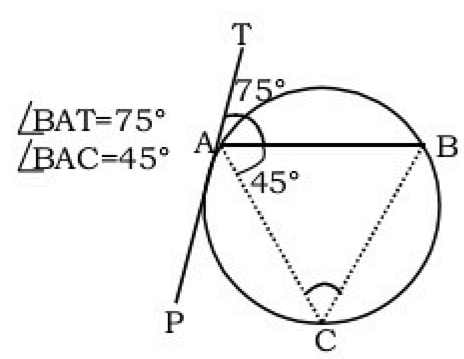
$\angle$ APQ = $\angle$ CPQ = y (CPCT)

$\therefore\ 2y + 2x = 180°$

$x + y = 90°$

$\therefore \angle QPR = 90°$

34. (c) According to question,
Given:



$\angle BAT = \angle BCA$

($\because$ Due to Alternate Segment theorem)

$\because \angle$ BCA = 75°

Then $\angle BAC + \angle BCA + \angle ABC = 180°$

45° + 75° + $\angle$ ABC = 180°

$\angle ABC = 60°$

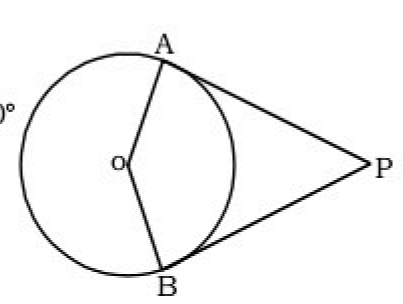
35. (a) According to question
Given: PAOB is quadrilateral

$\because \quad \angle AOB : \angle APB$

$5x : 1x$

Note: In Quadrilateral Sum of opposite angle is 180°

$\therefore \quad \angle AOB + \angle APB = 180°$



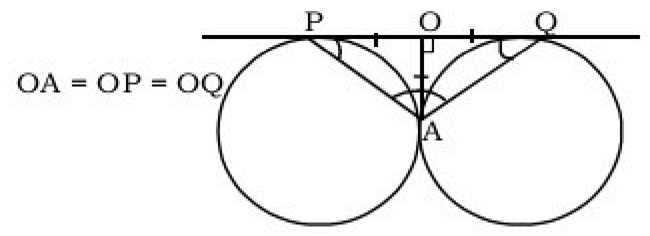
Then $5x + x = 180°$

$6x = 180°$

$x = 30°$

$\therefore \quad \angle APB = 30°$

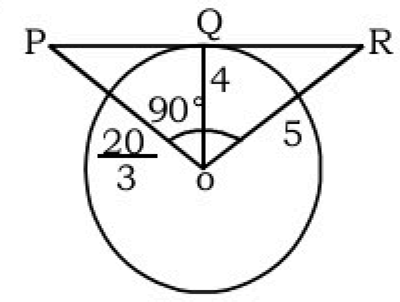
36. (b) According to Question,
AO is perpendicular to PQ



OA = $\frac{1}{2}$ PQ, (by the property of right angle)

$\therefore \ \angle PAQ = 90°$

37. (d) According to Question,
Given:



$\angle POR = 90°$

OR = 5 cm

OQ = 4 cm

OP = $\frac{20}{3}$ cm

$\therefore$ In $\triangle POR$

$PR^2 = PO^2 + OR^2$

$\left(\frac{20}{3}\right)^2 + (5)^2$

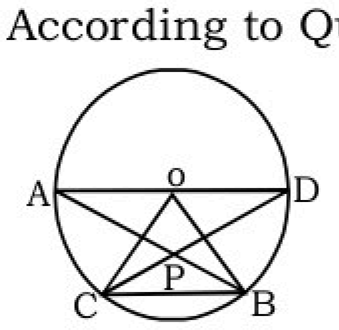
$PR^2 = \frac{400}{9} + 25$

$PR^2 \frac{400 + 225}{9}$

$PR^2 = \frac{625}{9}$

PR = $\frac{\mathbf{25}}{\mathbf{3}}$ cm

38. (c) According to Question



$\angle AOC + \angle BOD = 2\angle ABC + 2\angle BCD$

(Angle formed on major arc is half of the angle formed on centre)

$= 2\angle ABC + 2\angle BCD$

$= 2\angle BPD$

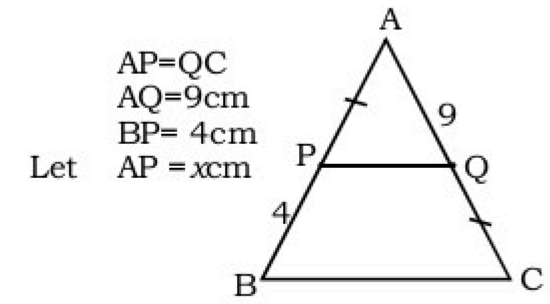
[Exterior angle of triangle]

$\angle AOC + \angle BOD = 2\angle BPD$

$2\angle BPD = 50° + 40°$

$\angle$BPD = $\frac{1}{2} \times 90° = 45°$

39. (c) According to Question
Given:



$\triangle APQ \sim \triangle ABC$

To apply similarity property

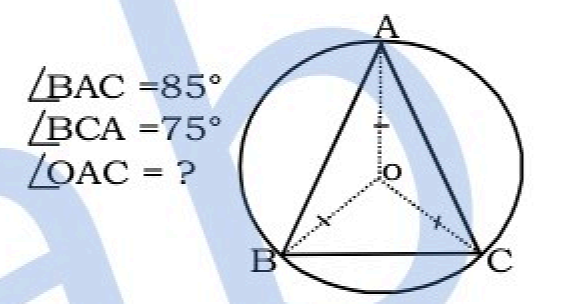
$\frac{AP}{BP} = \frac{AQ}{QC}$

$\frac{x}{4} = \frac{9}{x}$

$x^2 = 36, \quad x = 6$

$\therefore$ AP = 6 cm

40. (c) According to Question
Given:



$\angle ABC + \angle BCA + \angle CAB = 180°$

$\angle ABC = 20°$

$\therefore \angle COA = 2 \times \angle ABC$

$\angle COA = 2 \times 20 = 40°$

In $\triangle$ AOC

We know OC = OA

$\therefore \quad \angle OAC = \angle OCA$

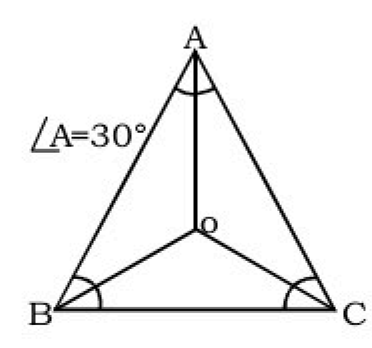
$\therefore \angle OAC + \angle OCA + \angle COA = 180°$

$2\angle OAC = 180° - 40°$

$2\angle OAC = 140°$

$\angle OAC = 70°$

41. (b) According to Question,
Given:



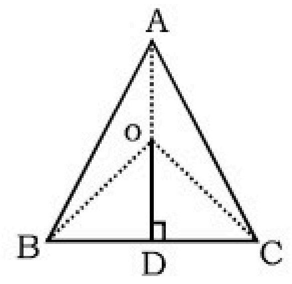
$\therefore \quad \angle BOC = 90° + \frac{1}{2}\angle A$

$= 90° + \frac{1}{2} \times 30°$

$= 90° + 15°$

$\angle BOC = 105°$

42. (c) According to Question,



Given : $\angle BOD = 15°$

$\therefore \angle BDO + \angle DOB + \angle DBO = 180°$

$\angle DBO = 75°$

$\angle ABC = 2 \times \angle DBO$

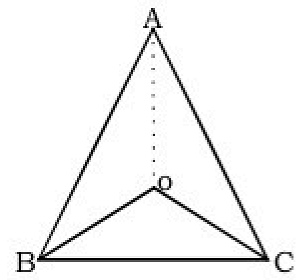
$\angle ABC = 2 \times 75°$

$\angle ABC = 150°$

43. (b) According to question,

Given: $\angle BOC = 110°$

$\angle BOC = 90° + \frac{1}{2}\angle A$

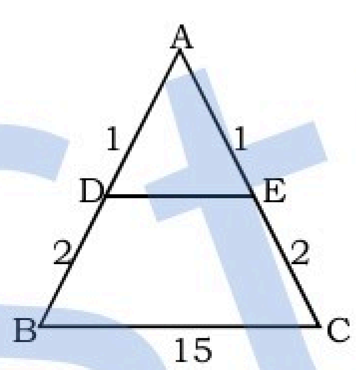


$110° = 90° + \frac{\angle A}{2}$

$\frac{\angle A}{2} = 20 \quad \angle A = 40°$

44. (d) According to question,

Given:



$AD = \frac{1}{3}AB, \quad \frac{AD}{AB} = \frac{1}{3}$

$AE = \frac{1}{3}AC, \quad \frac{AE}{AC} = \frac{1}{3}$

To apply similar triangle property

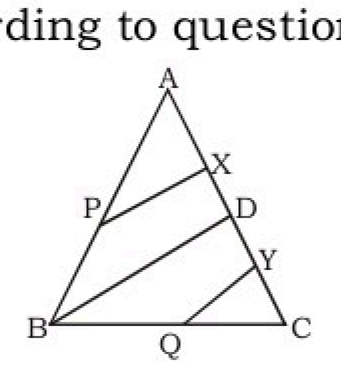
[Δ ADE ~ Δ ABC]

$\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} = \frac{1}{3}$

$\frac{DE}{15} = \frac{1}{3}$

⇒ DE = 5 cm

45. (b) According to question



PX||BD [mid point theorem]

$\therefore PX = \frac{1}{2}BD$

Similarly. QY||BD

$\therefore QY = \frac{1}{2}BD$

$\therefore PX : QY, \quad \frac{1}{2}BD : \frac{1}{2}BD$

PX : QY = 1 : 1

46. (c) In Equilateral triangle Orthocentre, in centre, circum-centre and centroid coincide

47. (c) In a right angled triangle orthocentre lies on vertex

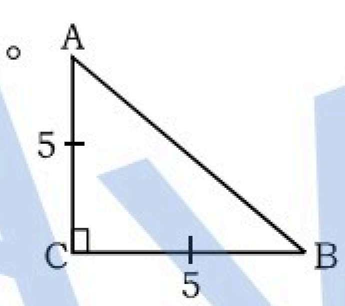
48. (b) Inradius $= \frac{a}{2\sqrt{3}}$ (a = side of Δ)

$3 = \frac{a}{2\sqrt{3}}, \qquad a = 6\sqrt{3}$

49. (c) According to question

Given:

$\angle C = 90°$



BC = AC = 5 cm (Isosceles triangle)

by pythagoras theorem.

$AB^2 = AC^2 + BC^2$

$AB^2 = 5^2 + 5^2$

$AB^2 = 25 + 25$

$AB^2 = 50$

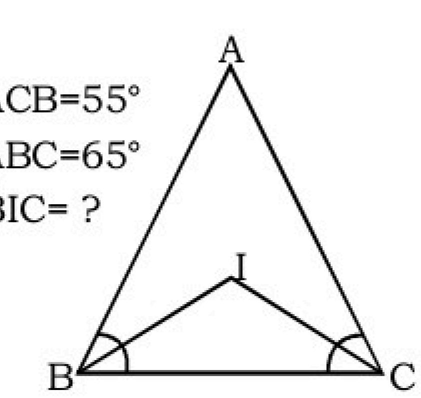
$AB = 5\sqrt{2}$ cm

50. (d) Circumcentre of a triangle lies outside then triangle is obtuse angled triangle.

51. (b) According to question

Given:

∠ACB=55°
∠ABC=65°
∠BIC= ?



$\therefore \angle ACB + \angle ABC + \angle BAC = 180°$

$\angle BAC = 180° - 55 - 65°$

$\angle BAC = 60°$

We know that

$\angle BIC = 90 + \frac{1}{2}\angle A$

$\angle BIC = 90 + \frac{1}{2} \times 60$

$= 90 + 30$

$\angle BIC = 120°$

Alternate

In Δ BIC,

$\frac{1}{2}\angle B + \frac{1}{2}\angle C + \angle BIC = 180°$

$\frac{1}{2}(65° + 55°) + \angle BIC = 180°$

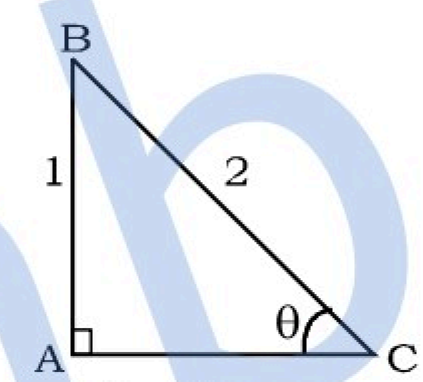
$\angle BIC = 180° - 60° = 120°$

52. (b) According to question

Given:

BAC is right angle triangle

$AB = \frac{1}{2}BC$



$\frac{AB}{BC} = \frac{1}{2} \quad \frac{P}{H} = \frac{1}{2}$

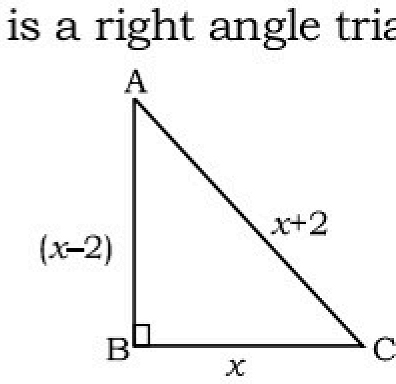
$\sin\theta = \frac{P}{H} = \frac{1}{2}$

$\sin 30° = \frac{1}{2}$

$\therefore \theta = \angle ACB = 30°$

53. (b) According to question

ABC is a right angle triangle



∴ Apply Pythagoras theorem

$AC^2 = AB^2 + BC^2$

$(x+2)^2 = (x-2)^2 + x^2$

$x^2 + 4 + 4x = x^2 + 4 - 4x + x^2$

$x^2 = 8x$

$x = 8$

Alternate:- from option approach

$(x - 2) \quad x \quad (x + 2)$

↓ ↓ ↓

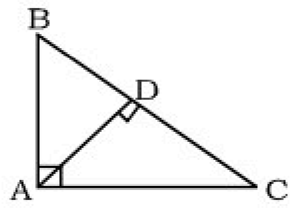
6 8 10

↓

Triplet

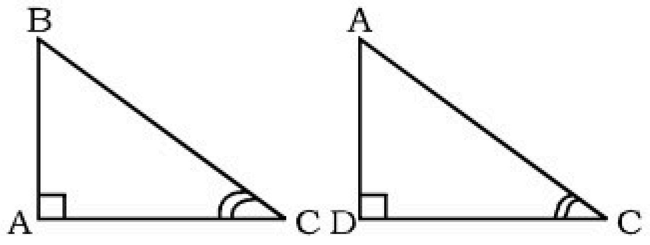
$x = 8$

54. (b) According to Question
Given: AC = 9 cm



area of $\triangle ABC$ = 40 cm^2
area of $\triangle ADC$ = 10 cm^2

$\triangle ABC \sim \triangle ADC$



$\frac{area\ of\ \triangle ABC}{area\ of\ \triangle ADC} = \frac{AB^2}{AD^2} = \frac{BC^2}{AC^2}$

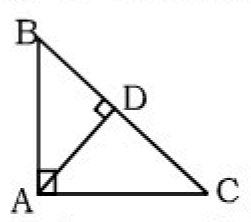
(In similar $\triangle$ ratio of their area is square of ratio of corresponding sides)

$\frac{40}{10} = \frac{BC^2}{(9)^2}$

$\frac{40}{10} \times 81 = BC^2$

BC = 18 cm

55. (d) According to Question



Given: BAC is a right angle triangle

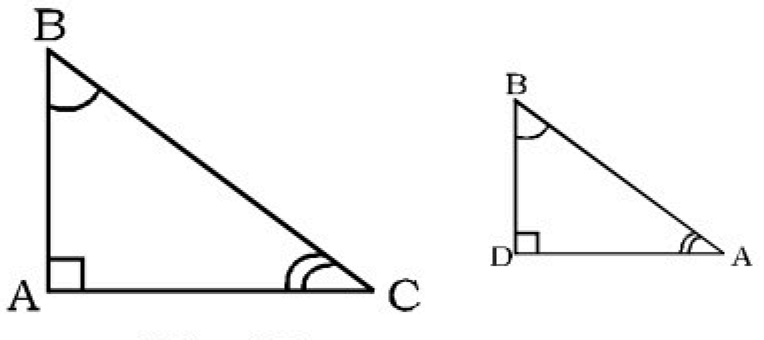
$AD \perp BC$
AD = 6 cm
BD =4 cm
BC = ?

In $\triangle BAD$

$AB = \sqrt{BD^2 + AD^2}$

$AB = \sqrt{4^2 + 6^2} = \sqrt{52}$ cm

$\triangle BAC \sim \triangle BDA$



$\therefore \frac{BC}{AB} = \frac{AB}{BD}$

$\therefore \frac{BC}{\sqrt{52}} = \frac{\sqrt{52}}{4}$

BC = $\frac{52}{4}$

BC = 13 cm

Alternate:-

$AB^2 = BD.BC$

$\left(\sqrt{BD^2+AD^2}\right)^2 = BD.BC$

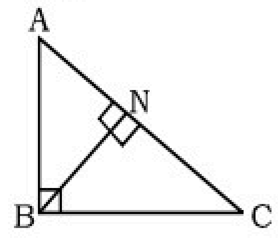
$\left(\sqrt{4^2 + 6^2}\right)^2 = 4.BC$

$\frac{52}{4} = BC,$

$\therefore BC = 13$ cm

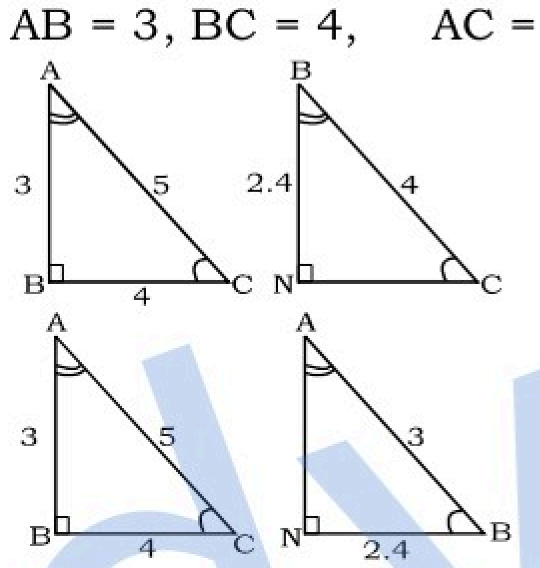
56. (b) According to question
Given: $\angle ABC = 90°$

$\frac{AN}{NC} = ?$



$\triangle ABC \sim \triangle BNC$
$\triangle ABC \sim \triangle ANB$
$\therefore \triangle ABC \sim \triangle BNC \sim \triangle ANB$

AB = 3, BC = 4, AC = 5



$\frac{AB}{BN} = \frac{AC}{BC}$

$BN = \frac{AB \times BC}{AC} = \frac{3 \times 4}{5} = 2.4$

$\frac{BC}{NC} = \frac{AB}{NB}$

$\frac{4}{NC} = \frac{3}{2.4}$

NC = 3.2

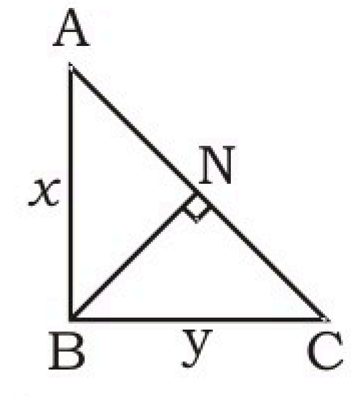
$\frac{AB}{AN} = \frac{BC}{NB}$ $\quad \frac{3}{AN} = \frac{4}{2.4}$

AN = 1.8

$\therefore \frac{AN}{NC} = \frac{1.8}{3.2} = \frac{9}{16}$

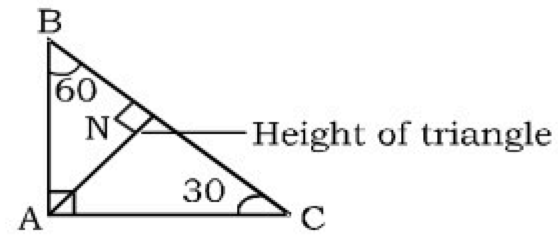
Alternate

In such cases use the following method to save your valuable time.



$\frac{AN}{NC} = \frac{x^2}{y^2}$

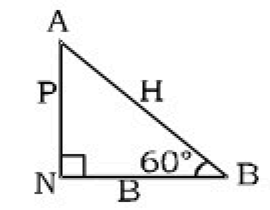
57. (b) According to Question
Given: ABC is a right angle triangle



BC = $6\sqrt{3}$

$\therefore$ $Sin30° = \frac{P}{H} = \frac{AB}{6\sqrt{3}}$

$AB = 3\sqrt{3}$



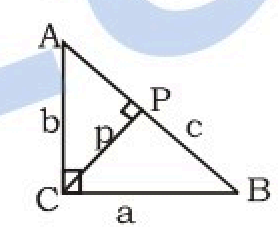
$Sin\ 60° = \frac{P}{H} = \frac{AN}{AB}$

$\frac{\sqrt{3}}{2} = \frac{AN}{3\sqrt{3}}$

AN = $\frac{9}{2}$

AN = 4.5 cm

58. (b) According to question,
ACB is a right angle triangle
$\therefore$ area of $\triangle$ACB



$\frac{1}{2} \times AC \times BC = \frac{1}{2} \times AB \times PC$

$\frac{1}{2} \times b \times a = \frac{1}{2} \times c \times p$

$c = \frac{ab}{p}$ ....(i)

By using pythagoras theorem
$AB^2 = AC^2 + BC^2$
$c^2 = b^2 + a^2$............(ii)
Put the value of C in equation (ii)

$\left(\frac{ab}{p}\right)^2 = a^2 + b^2$

$\frac{a^2b^2}{p^2} = a^2 + b^2$

$= \frac{1}{P^2} = \frac{a^2}{a^2b^2} + \frac{b^2}{a^2b^2}$

$\frac{1}{P^2} = \frac{1}{a^2} + \frac{1}{b^2}$

Alternate

From figure,

$$P = \frac{ab}{c}$$

$$P = \frac{ab}{\sqrt{a^2+b^2}} \quad (\because a^2 + b^2 = c^2)$$

$$P^2 = \frac{a^2b^2}{a^2+b^2}$$

$$\frac{1}{p^2} = \frac{1}{a^2}+\frac{1}{b^2}$$

59. (b) The orthocentre of a right angled triangle lies at the right angular vertex

60. (b) According to question.
Given: Interior Angle
= 3 × Exterior Angle
As we know that
Interior Angle + Exterior Angle = 180°
3Exterior Angle + Exterior Angle = 180°
4 exterior = 180°

$$\text{Exterior angle} = \frac{180°}{4} = 45°$$

$$\therefore \text{No. of Sides} = \frac{360°}{\textit{Exterior angle}}$$

$$\text{No. of Sides} = \frac{360°}{45°} = 8$$

61. (d) According to question,
Given: Interior = 2× Exterior
Exterior + Interior = 180°
Exterior + 2 Exterior = 180°
3 Exterior = 180°

$$\text{Exterior} = \frac{180}{3} = 60°$$

$$\therefore \text{No. of sides} = \frac{360°}{\text{Exterior angle}}$$

$$\text{No. of sides} = \frac{360°}{60°} = 6$$

62. (c) Let the sides be x and $2x$
According to question

$$\frac{180° - \frac{360°}{n_1}}{180° - \frac{360°}{n_2}} = \frac{2}{3}$$

$$\frac{180° - \frac{360°}{x}}{180° - \frac{360°}{2x}} = \frac{2}{3}$$

$$540° - \frac{1080°}{x} = 360° - \frac{360°}{x}$$

$$180° = \frac{720°}{x}$$

$x = 4$

$\therefore$ Sides be x and $2x = 4,8$

Alternate

In this question go through option.
option: C 4,8

$$\text{Given: } \frac{n_1}{n_2} = \frac{1}{2}$$

(n = no. of sides)

$$\frac{I_1}{I_2} = \frac{2}{3} \text{ (I = Interior Angle)}$$

$\therefore$ Through option $n_1 = 4$
$n_2 = 8$

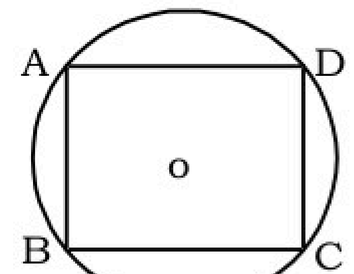
$$\therefore \; E_1 = \frac{360°}{n_1} = \frac{360°}{4} = 90°$$

$$E_2 = \frac{360°}{n_2} = \frac{360°}{8} = 45°$$

As we know that
I + E = 180°
$I_1 + E_1 = I_1 + 90° = 180°$
$I_1 = 90°$
$I_2 + E_2 = I_2 + 45° = 180°$
$I_2 = 180° - 145° = 135°$

$$\frac{I_1}{I_2} = \frac{90°}{135°} = \frac{2}{3} \text{ (Satisfied)}$$

63. (d) According to question
ABCD is a cyclic parallelogram
In a cyclic quadrilateral sum of opposite angle is 180°
But In cyclic parallelogram opposite angles are same



But ∠B + ∠D = 180°

$$\angle B + \angle D = 180°$$

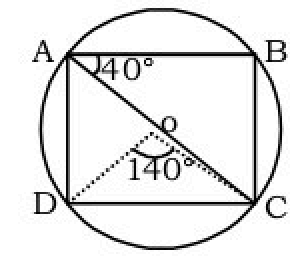
$$\angle B + \angle B = 180°$$

$$2\angle B = 180°$$

$$\angle B = \frac{180°}{2}$$

$$\angle B = 90°$$

64. (a) According to question
ABCD is a cyclic quadrilateral



$$\angle CAD = \frac{1}{2}\angle COD$$

(The angle subtended by an arc of a circle at the centre is double the angle subtened by it at any point on the remaining part of the circle)

$$\angle CAD = \frac{1}{2} \times 140°$$

$$\angle CAD = 70°$$

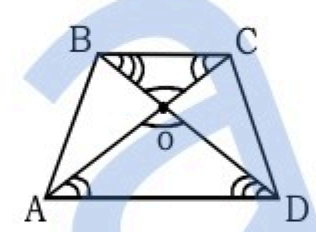
$\therefore$ $\angle DAB = 70 + 40 = 110°$

In cyclic quadrilateral sum of opposite angles are 180°

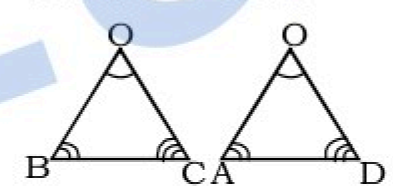
$\angle A + \angle C = 180°$

$\angle C = 180° - 110° = 70°$

65. (d) According to question,



$\Delta AOD \sim \Delta COB$

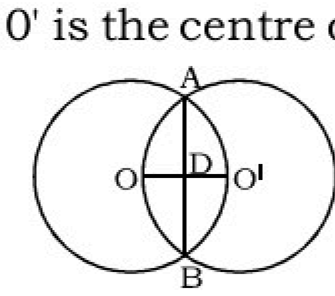


$$\therefore \frac{OB}{OD} = \frac{OC}{OA}$$

$$\frac{3x-19}{x-5} = \frac{x-3}{3}$$

$9x - 57 = x^2 - 8x + 15$
$x^2 - 17x + 72 = 0$
$x(x-8) - 9(x-8) = 0$
$(x-8)(x-9) = 0$
$x = 8$ or 9

66. (b) According to question
AB is a common chord
O and 0' is the centre of the circle.



In ΔODA
$AO^2 = AD^2 + OD^2$
$(4)^2 = (AD)^2 + (2)^2$
$AD^2 = 12$

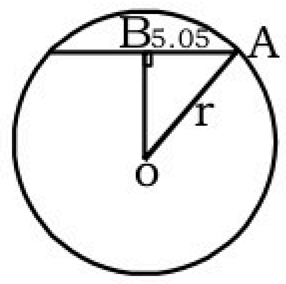
$AD = 2\sqrt{3}$

$\therefore$ AB = 2 × AD

AB = 2 × $2\sqrt{3}$ = $\mathbf{4\sqrt{3}}$

67. (b) According to question

OBA is a right angle triangle

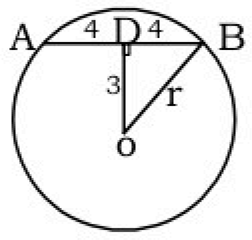


∴ OA is a hypotenuse

∴ Hypotenuse is always greater than other two sides

∴ Radius is always greater than 5 cm

68. (b) According to question.



In ΔBDO, using pythagoras

$BO^2 = OD^2 + BD^2$

$r^2 = (4)^2 + (3)^2$

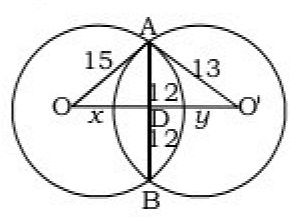
$r^2 = 16 + 9$

$r^2 = 25$

r = 5

69. (b) Let OD = x and DO = y

According to question



In ΔADO

$AO^2 = OD^2 + AD^2$

$(15)^2 = x^2 + (12)^2$

$x^2 = 225 - 144$

$x^2 = 81$

$x = 9$

In $\Delta ADO'$

$(AO')^2 = AD^2 + DO'^2$

$(13)^2 = (12)^2 + y^2$

$169 = 144 + y^2$

$y^2 = 169 - 144$

$y^2 = 25$

$y = 5$

$\therefore x + y = 9 + 5$

$= 14$

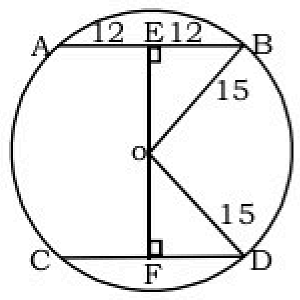
70. (b) According to question length of arc $= \frac{\theta}{360°} \times 2\pi r$

$= \frac{72°}{360°} \times 2 \times \frac{22}{7} \times 21$

= 26.4 cm

71. (b) one and only circle can pass through 3 non- collinear points.

72 (b) According to question



AB = 24 cm

AE = EB = 12 cm

$OE = \sqrt{(OB)^2 - (EB)^2}$

$= \sqrt{15^2 - 12^2}$

$= \sqrt{225 - 144} = \sqrt{81}$

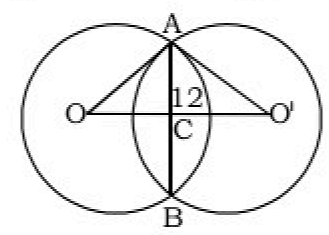
= 9 cm

∴ OF = 21 – 9 = 12 cm

also $FD = \sqrt{15^2 - 12^2}$ = 9 cm

∴ CD = 2 × 9 = 18 cm

73. (a) According to Question



AB = 16

AC = BC = 8 cm

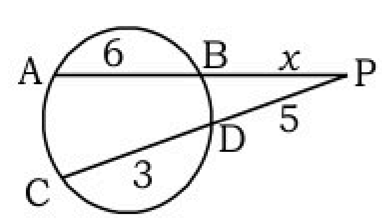
OC = O'C = 6 cm

$OA = \sqrt{OC^2 + CA^2}$

$OA = \sqrt{6^2 + 8^2} = \sqrt{36 + 64}$

$OA = \sqrt{100}$ = 10 cm

74. (d) According to Question



Given: AB = 6, CD =3.

PD = 5

Let PB = x

Note: If chords AB and CD intersect externally at point, p then

PB × PA = PD × PC

$x \times (6 + x) = 5 \times 8$

$x^2 + 6x - 40 = 0$

$x^2 + 10x - 4x - 40 = 0$

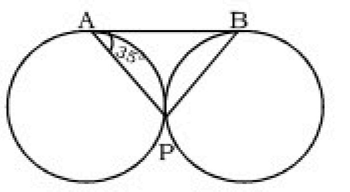
$x(x + 10) - 4(x + 10) = 0$

$(x + 10)(x - 4) = 0$

$x = 4, -10$ (–10 neglected)

∴ PB = 4 cm

75. (b) According to question



Given: $\angle PAB = 35°$

As we know that

$\angle APB = 90°$

Therefore,

$\therefore \angle PAB + \angle APB + \angle ABP = 180°$

$\angle ABP = 180° - 90° - 35°$

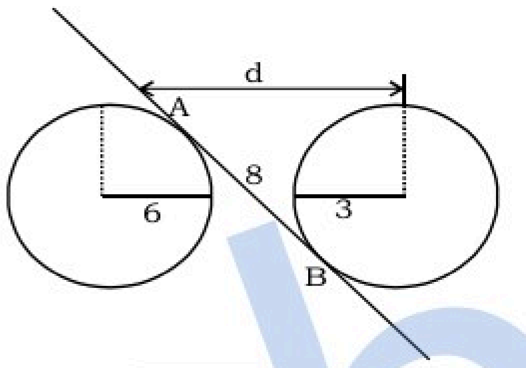
$\angle ABP = 55°$

76. (a) According to question

Let length of transverse common tangent

= AB = 8 cm

Distance between them = d



$AB = \sqrt{d^2 - (R_1 + R_2)^2}$

$AB^2 = d^2 - (R_1 + R_2)^2$

$(8)^2 = d^2 - (6 + 3)^2$

$64 = d^2 - 81$

$d^2 = 145$

$d = \sqrt{145}$

77. (a) According to Question

Let length of transverse common tangent

= AB

Distance between them = 10 cm

$AB = \sqrt{d^2 - (R_1 + R_2)^2}$

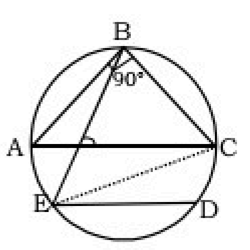
$AB = \sqrt{(10)^2 - (3 + 3)^2}$

$AB = \sqrt{100 - 36}$

$AB = \sqrt{64}$

AB = 8 cm

78. (d) According to question



$\angle CBE = 50°$

$\angle ABC = 90°$

$\therefore \angle ABE = 90° - 50° = 40°$

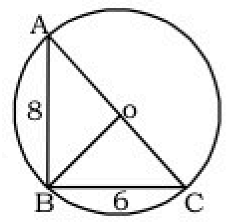
$\therefore \angle ABE = \angle ACE = 40°$

Note: Angle on same segment are same

∠ACE = ∠DEC = 40°(Alternate angle)

AC || ED

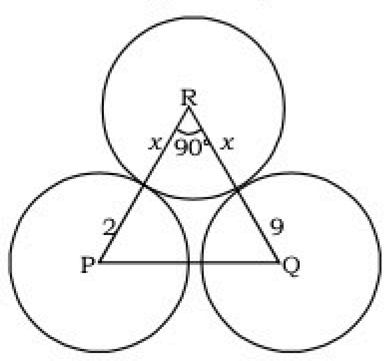
79. (a) According to question
ABC is a right angle triangle,



$\therefore$ AB = 8 cm
BC = 6 cm
$\therefore$ $AC^2 = AB^2 + BC^2$
AC = 64 + 36
AC = $\sqrt{100}$ = 10 cm
In right triangle

Circum Radius $I_R = \frac{AC}{2} = \frac{10}{2} = 5\,\text{cm}$

80. (b) According to question



$\angle PRQ$ = 90°
PR = 2 + x
PQ = 17
RQ = 9 + x
By using pythagoras theorem
$PQ^2 = PR^2 + RQ^2$
$(17)^2 = (2+x)^2 + (9+x)^2$
$289 = 4 + x^2 + 4x + 81 + x^2 + 18x$
$x^2 + 11x - 102 = 0$
$x^2 + 17x - 6x - 102 = 0$
$x + 17) - 6(x + 17) = 0$
$(x + 17)(x - 6) = 0$
$x = 6$ as $x \neq -17$
$\therefore x = 6$ cm

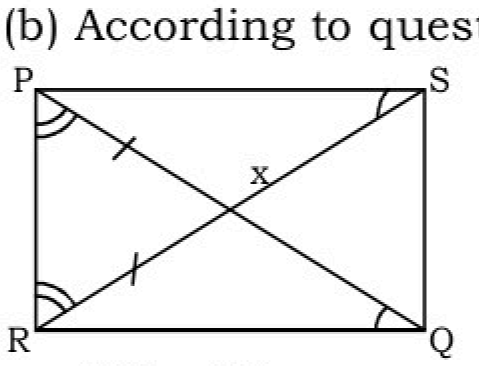
Alternate

$\triangle$ PRQ = Right angle $\triangle$

PQ(H)	QR(B)	PR(P)
↓	↓	↓
17cm	(9 +x)cm	(2 + x) cm

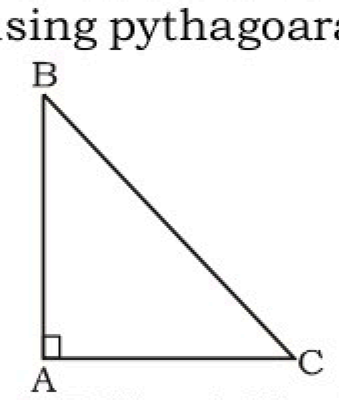
Triplet = (17,15,8)
$\therefore x = 6$ cm

81. (b) According to question



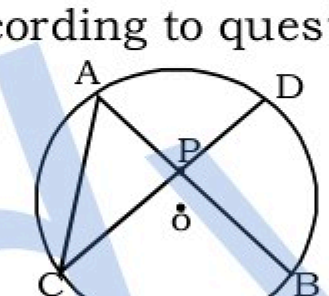
XP = XR
$\therefore$ $\angle PSX = \angle RQX$
If $\angle XPR = \angle XRP$
$\therefore$ In $\triangle$ RXQ and $\triangle$ PXS
RX = PX (given)
$\angle$RXQ = $\angle$PXS (VOA)
$\angle$RQX = $\angle$PSX (given)
$\triangle$RXQ $\cong$ $\triangle$PXS (AAS)
$\therefore$ PS = RQ (CPCT)

82. (b) According to question
ABC is a right angle triangle
$\therefore$ By using pythagoaras theorem



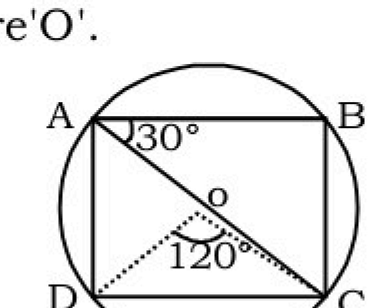
$BC^2 = AC^2 + AB^2$
and BC = $\sqrt{2}$ AB (given)
Now,
$\left(\sqrt{2}AB\right)^2 = AC^2 + AB^2$
$2AB^2 = AC^2 + AB^2$
$AC^2 = AB^2$
AC = AB
$\therefore$ $\angle ABC = \angle ACB$ ° = 45°
(equal side have equal angle)

83. (c) According to question



$\angle BOC = 2\angle BAC$
$\therefore$ $\angle AOD = 2\angle ACD$
$\therefore$ $\angle BOC + \angle AOD = 2(\angle BAC + \angle ACD)$
$= 2\angle BPC$
$30° + 20° = 2\angle BPC$
$\angle BPC = \frac{50°}{2}$
$\angle BPC$ = 25°

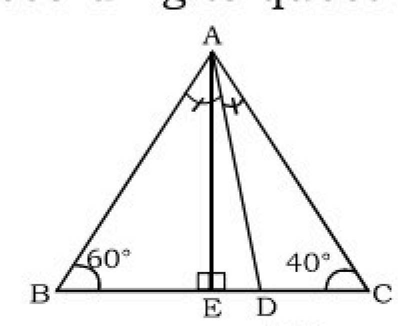
84. (b) According to question,
ABCD is cyclic quadrilateral with centre'O'.



Given:
$\angle COD$ = 120°
$\angle BAC$ = 30°
$\angle BCD$ = ?
$\angle CAD = \frac{1}{2}\angle COD$
$\angle CAD = \frac{1}{2} \times 120° = 60°$
$\therefore$ $\angle BAD$ = 30° + 60° = 90°

Note: In cyclic quadrilateral sum of opposite angles is 180°
$\angle BAD + \angle BCD$ = 180°
$\angle BCD$ = 180° – 90°
$\angle BCD$ = 90°

85. (b) According to question,

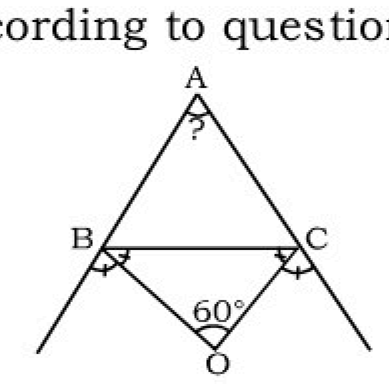


Given: $\angle B$ = 60°
$\angle C$ = 40°
As we know that
$\angle A + \angle B + \angle C$ = 180°
$\angle A$ = 180° – 60° – 40°
$\angle A$ = 80°
$\therefore$ $\angle$ BAD = $\frac{80°}{2}$ = 40°
In $\triangle AEB$
$\angle A + \angle B + \angle E$ = 180°
$\angle A$ = 180°– 60° – 90°
$\angle A$ = 30°
Then,
$\angle DAE = \angle DAB - \angle EAB$
= 40 – 30
$\angle DAE$ = 10°

By Trick:

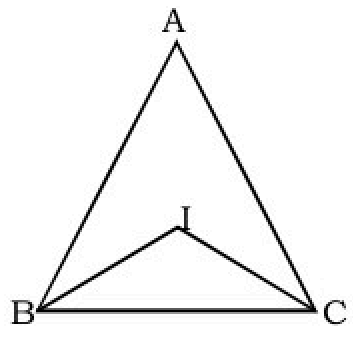
$\angle$ DAE = $\frac{\angle B - \angle C}{2}$
$= \frac{60° - 40°}{2}$ = 10°

86. (c) According to question



Given: $\angle BOC$ = 60°
As we know that
$\therefore$ $\angle O = 90 - \frac{1}{2}\angle A$
$\frac{1}{2}\angle A$ = 90° – 60°
$\frac{1}{2}\angle A$ = 30°
$\angle A$ = 60°

87. (c) According to question



Given: $\angle ABC = 60°$

$\angle BCA = 80°$

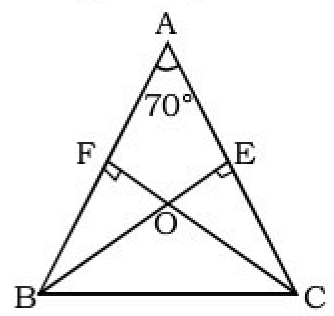
$\angle BIC = ?$

$\angle BAC = 40°$

$\therefore \angle BIC = 90° + \frac{1}{2} \times 40°$

$\angle BIC = 110°$

88. (d) According to question



Given: $\angle A = 70°$

AEOF is a quadrilateral

$\therefore$ In a quadrilateral sum of all angles is 360°

$\angle A + \angle F + \angle O + \angle E = 360°$

$70° + 90° + \angle O + 90° = 360°$

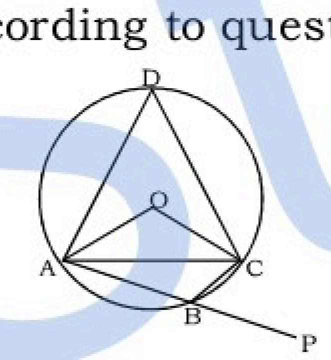
$\angle O = 360° - 250°$

$\angle O = 110°$

$\angle BOC = 110°$

(Vertically Opposite angles)

89. (c) According to question



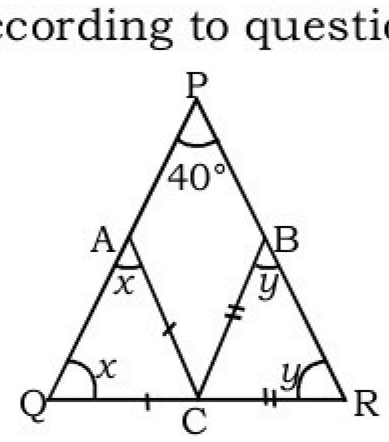
Given: $\angle AOC = 130°$

$= \angle ADC = \frac{1}{2} \times 130° = 65°$

$\therefore \angle PBC = \angle ADC$

(Exterior angle of Cyclic quadrilateral = The internal opposite angle)

90. (d) According to question



In ΔPQR

$x + y + 40° = 180°$

$x + y = 140$ ...... (i)

In ΔAQC

$x + x + \angle C = 180°$

$\angle C = 180° - 2x$ ....(ii)

In ΔBCR

$y + y + \angle C = 180°$

$\angle C = 180° - 2y$ ....(iii)

But $\angle ACB = 180° - 180° + 2x - 180° + 2y$

$= 2x + 2y - 180°$

$= 2(x + y) - 180°$......(iv)

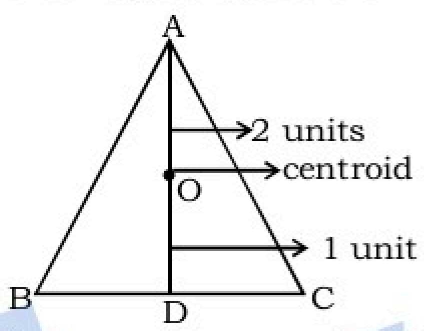
Put the value of equation (i) in equation (iv)

$\angle ACB = 2 \times 140° - 180°$

$= 280° - 180°$

$\angle ACB = 100°$

91. (b) According to question



AD is the median and 'C' is the centroid

$\therefore$ AO = 10 cm

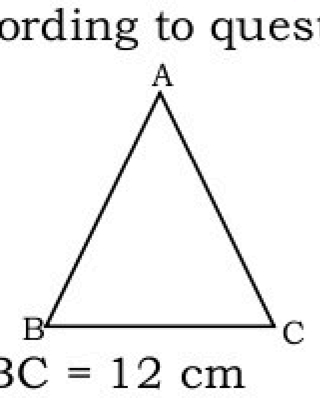
2 units = 10

1 units = 5

$\therefore$ OD = 5 cm

92. (c) The equidistant point from the vertices of a triangle is called circumcentre

93. (b) According to question,



AB + BC = 12 cm

BC + CA = 14 cm

CA + AB = 18 cm

2(AB + BC + CA) = 44 cm

$AB + BC + CA = \frac{44}{2}$ cm

AB + BC + CA = 22 cm

Perimeter of triangle = 22 cm

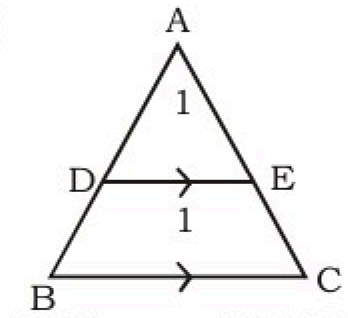
Perimeter of triangle

= perimeter of circle

$22 = 2\pi r$

$2 \times \frac{22}{7} \times r = 22, \quad r = \frac{7}{2}$ cm

94. (b)



ar ADE = ar DEBC

So, ar Δ ADE= 1 unit^2 and ar ABC = 2unit^2

$\frac{ar\Delta ADE}{ar\Delta ABC} = \frac{AD^2}{AB^2}$

$\frac{1}{2} = \left(\frac{AD}{AB}\right)^2$

$\frac{1}{\sqrt{2}} = \frac{AD}{AB}$

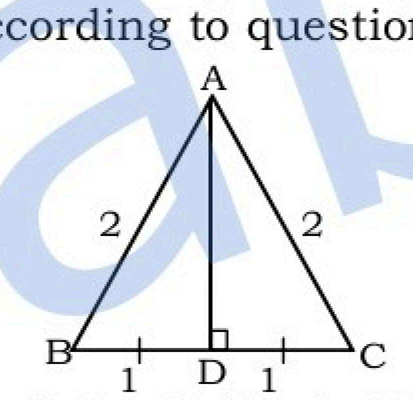
$\therefore \frac{AD}{DB} = \frac{1}{\sqrt{2} - 1}$

$\left(\because DB = AB - AD = \sqrt{2} - 1\right)$

So, AD : BD = 1 : $\sqrt{2} - 1$

95. (b) If three altitudes are equal then the triangle is Equilateral.

96. (c)According to question



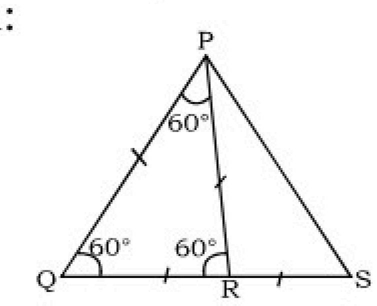
In equilateral triangle 'AD' bisects the BC in two equal parts

Let side of equilateral triangle is 2 cm

$\therefore \frac{AB}{BD} = \frac{2}{1}$

97. (a) According to question

Given:



PQR is an equilateral triangle

QR = RS

PR = RS

$\angle SRP = 180° - 60°$ (Exterior $\angle$)

$= 120°$

$\therefore \angle RPS = \angle RSP$

$\therefore \angle RPS + \angle PRS + \angle RSP = 180°$

$2\angle PSR = 180° - 120°$

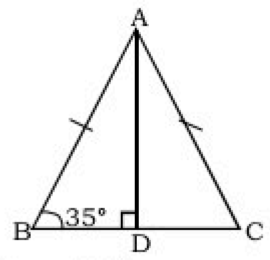
$\angle PSR = \frac{60°}{2}$

$\angle PSR = 30°$

98. (a) ABC is an equilateral triangle and AX, BY and CZ be the altitude so

AX = BY = CZ

99. (d) According to question



AB = AC, $\angle B = \angle C$

$\angle A + \angle B + \angle C = 180°$

$\angle A + 2\angle B = 180°$

$\angle A = 180° - 70°$

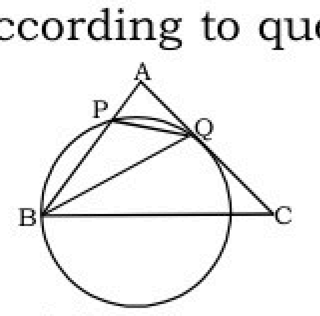
$\angle A = 110°$

Note: In isosceles triangle median bisects the opposite side and make angle 90° on opposite side. It also bisects the vertex angle.

$\angle BAD = \frac{\angle A}{2}$

$\angle BAD = \frac{110°}{2} = 55°$

100. (d) According to question



let AB = AC = $2x$

$\because$ AQ = QC = x

$\therefore$ AB is a secant

$\therefore$ AP × AB = AQ^2

AP $\times 2x = x^2$

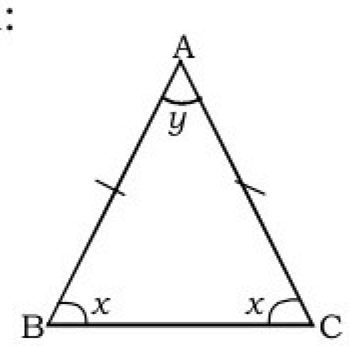
AP = $\frac{x}{2}$

$\frac{AP}{AB} = \frac{x}{2 \times 2x} = \frac{1}{4}$

$\frac{AP}{AB} = \frac{1}{4}$

101. (c) According to question

Given:



AB = AC

$y = 2(x + x)$

$y = 4x$

$\therefore$ $x + x + y = 180°$

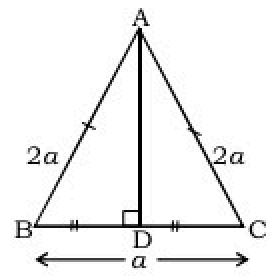
$2x + 4x = 180°$

$6x = 180°$

$x = \frac{180°}{6}$, $x = 30°$

102. (b) According to question

Given:



AB = AC = 2a

BC = a

$AD \perp BC$

In isosceles triangle perpendicular sides bisects the opposite side of the length

$\therefore$ BD = $\frac{BC}{2}$

BD = $\frac{a}{2}$

In ΔADB using pythagoras theorem .

$AB^2 = BD^2 + AD^2$

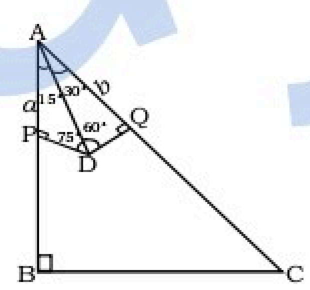
$(2a)^2 = \left(\frac{a}{2}\right)^2 + AD^2$

$4a^2 = \frac{a^2}{4} + AD^2$

$AD^2 = 4a^2 - \frac{a^2}{4}$

AD = $\frac{\sqrt{15}a}{2}$ units

103. (c) According to question from ΔAQD



$\angle A = \frac{180 - 90}{2}$

$\angle A = 45°$

$\angle DAQ = 30°$

Sin60° = $\frac{AQ}{AD}$

$\frac{\sqrt{3}}{2} = \frac{b}{AD}$

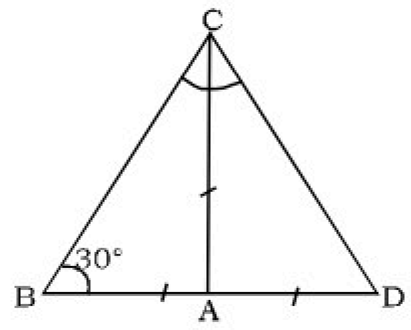
AD = $\frac{2b}{\sqrt{3}}$

From ΔAPD

Sin75° = $\frac{AP}{AD}$

Sin75° = $\frac{a}{2b} \times \sqrt{3} = \frac{\sqrt{3}a}{2b}$

104. (b) According to question



In Δ ABC

exterior angle CAD = $\angle$ABC + $\angle$ACB

= 2$\angle$ABC ($\because$ $\angle$ABC = $\angle$ACB)

= 2 × 30° = 60°

In Δ CAD,

$\angle ACD = \angle ADC = \frac{180 - \angle CAD}{2}$

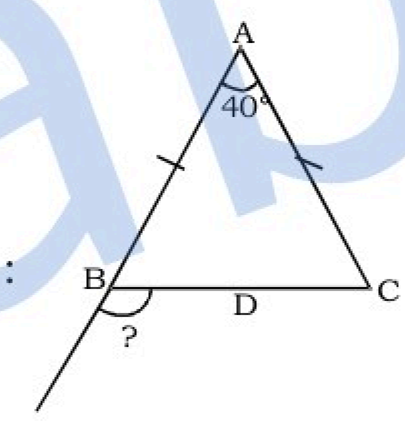
= 60°

$\Rightarrow$ $\angle$BCD = $\angle$ACD + $\angle$BCA

= 60 + 30 = 90°

105. (c) According to question

Given :



$\angle A = 40°$ AB = AC

$\therefore$ $\angle B = \angle C$

In ΔABC

$\angle A + \angle B + \angle C = 180°$

$40° + 2\angle B = 180°$

$2\angle B = 180° - 40°$

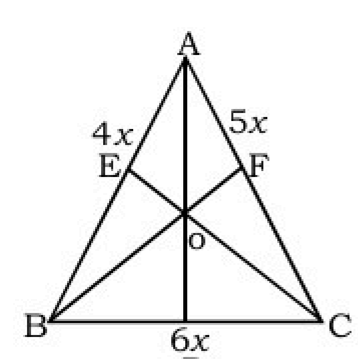
$2\angle B = 140°$

$\angle B = 70°$

$\therefore$ External angle at B = 180° – 70 = 110°

106. (b) The sum of two sides of a triangle should be greater than the third side. There are only two possible pairs (2,5,6) and (3,5,6)

107. (a) According to question,



Area of $\triangle$ (OBA + OAC + OBC)

= area of $\triangle$ABC

$$\frac{1}{2}\times 4x\times 3+\frac{1}{2}\times 5x\times 3+\frac{1}{2}\times 6x\times 3$$

$$= \frac{1}{2}\times(6x\times \text{AD})$$

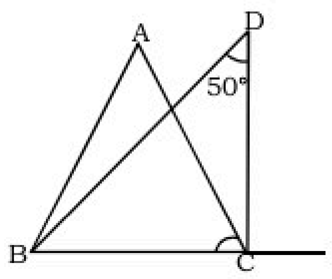
$$\frac{1}{2}\times 3(4x+5x+6x)=\frac{1}{2}\times(6x\times AD)$$

$$45x = 6x \times \text{AD}$$

$$\text{AD} = \frac{15}{2}$$

AD = 7.5 cm

108. (a) According to question



Given:

$\angle D = 50°$

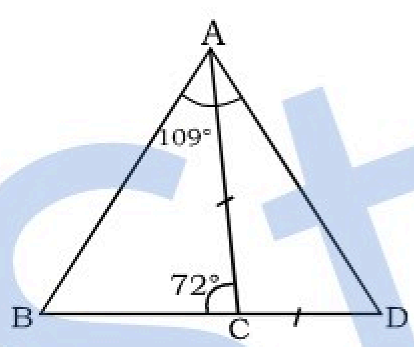
$\angle BAC = 2\angle BDC$ (property)

$\therefore \angle BAC = 2 \times 50°$

$\angle BAC = 100°$

109. (a) According to question

Given:



$\angle BAD = 109°$

$\angle ACB = 72°$

$\therefore \angle ACD = 180° - 72°$

$\angle ACD = 108°$

$\therefore$ AC = CD

$\angle CAD = \angle CDA$

In $\triangle CDA$

$\angle CAD + \angle CDA + \angle DCA = 180°$

$2\angle CAD + 108° = 180°$

$2\angle CAD = 180° - 108°$

$2\angle CAD = 72°$

$$\angle CAD = \frac{72°}{2}$$

$\angle CAD = 36°$

$\therefore \angle CAB = 109° - 36°$

$\angle CAB = 73°$

In $\triangle ABC$

$\angle ABC + \angle ACB + \angle CAB = 180°$

$\angle ABC + 72° + 73° = 180°$

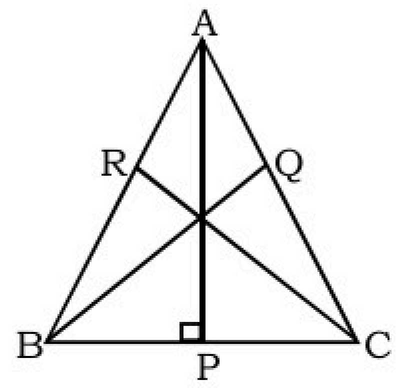
$\angle ABC + 145° = 180°$

$\angle ABC = 180° - 145°$

$\angle ABC = 35°$

110. (b) According to question

To See in the figure.



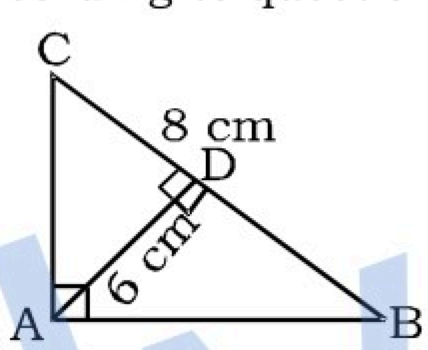
AB > AP

BC > BQ

AC > CR

$\therefore$ AP + BQ + CR <AB + BC + AC

111. (c) According to question



$\triangle CAB \sim \triangle CDA$

$$\therefore \frac{area\ of\ \triangle CAB}{area\ of\ \triangle CDA} = \frac{BC^2}{AD^2}$$

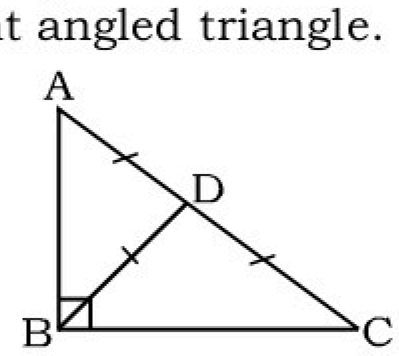
$$\frac{area\ of\ \triangle CAB}{area\ of\ \triangle CDA} = \frac{8^2}{6^2}$$

$$\frac{area\ of\ \triangle CAB}{area\ of\ \triangle CDA} = \frac{64}{36}$$

$$\frac{area\ of\ \triangle CAB}{area\ of\ \triangle CDA} = \frac{16}{9}$$

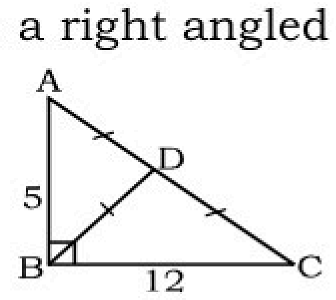
112. (a) According to question

If the median drawn on the base of a triangle is half of its base of the triangle then the triangle will be right angled triangle.



113. (c) According to question

ABC is a right angled triangle



$\therefore$ By using pythagoras theorem

$AC^2 = AB^2 + BC^2$

$AC^2 = (5)^2 + (12)^2$

$AC^2 = 25 + 144$

$AC^2 = 169$

$AC^2 = \sqrt{169}$

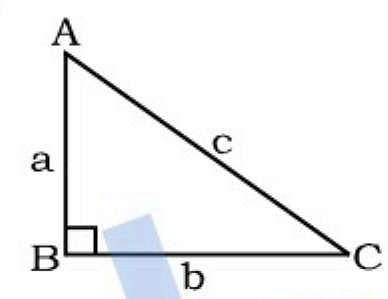
AC = 13 cm

$$BD = I_R = \text{Circumradius} = \frac{AC}{2}$$

$$\therefore \quad I_R = \frac{13}{2}, \qquad I_R = 6.5 \text{ cm}$$

114. (c) According to question

Given:



$$ab = \frac{C^2}{2} \qquad \text{....(i)}$$

$\therefore$ In $\triangle ABC$

Using Pythagoras theorem

$AC^2 = AB^2 + BC^2$

$c^2 = a^2 + b^2$ ....(ii)

Put the value of C^2 in equation (i)

$2ab = a^2 + b^2$

$a^2 + b^2 - 2ab = 0$

$(a - b)^2 = 0$

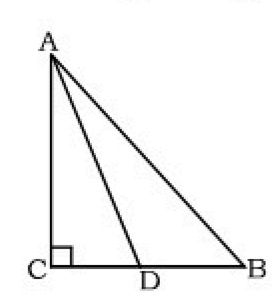
$\therefore$ a – b = 0

a = b

If a = b means ABC is isosceles right angle triangle it means

$\angle A = 45°$ $\angle B = 45°$

115. (a) According to question



In $\triangle ABC$

$AB^2 = AC^2 + BC^2$........(i)

$\triangle ACD$

$AD^2 = AC^2 + CD^2$

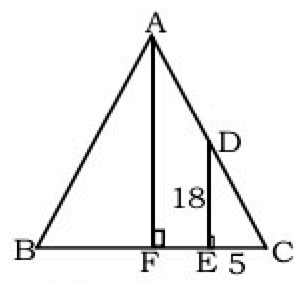
$AC^2 = AD^2 - CD^2$ ....(ii)

Put the value of AC^2 in equation (i)

$AB^2 = AD^2 - CD^2 + BC^2$

$AB^2 + CD^2 = AD^2 + BC^2$

116. (a)According to question



Given: DE = 18 cm

EC = 5 cm

$\tan\angle ABC = 3.6$

$\tan C = \frac{DE}{EC}$

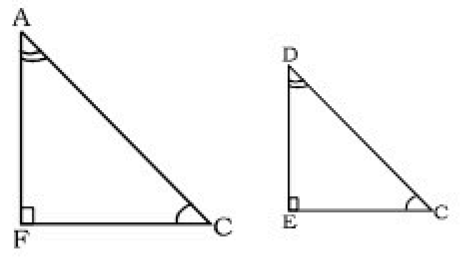
$\tan C = \frac{18}{5}$

tan C = 3.6

$\therefore \tan\angle ABC = \tan\angle ACB$

Note: In an isosceles triangle perpendicular bisects the opposite sides

$\therefore\ \Delta AFC \sim \Delta DEC$



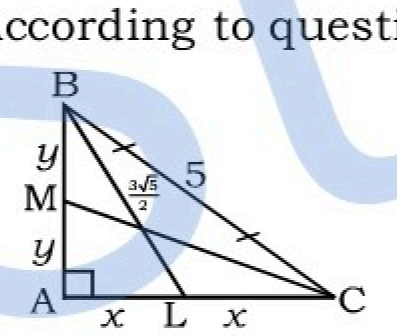
$\frac{AF}{DE} = \frac{AC}{DC} = \frac{FC}{EC}$

$\therefore\ \frac{AC}{CD} = \frac{FC}{EC}$ $\quad (\therefore\ FC = \frac{BC}{2})$

$\frac{AC}{CD} = \frac{BC}{2EC}$

$\Rightarrow$ AC : CD = BC : 2EC

117. (a) According to question



According to figure, when two medians intersect each other in a right angled triangle then we use, this equation.

$\Rightarrow 4\,(BL^2 + CM^2) = 5BC^2$

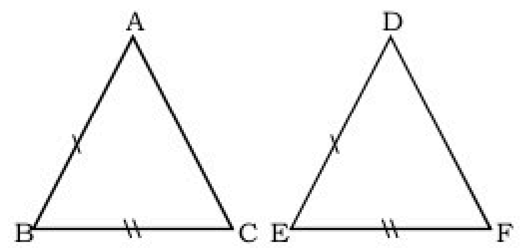
$\Rightarrow 4 \times \left(\frac{3\sqrt{5}}{2}\right)^2 + 4CM^2 = 5BC^2$

$\Rightarrow 45 + 4CM^2 = 125$

$\Rightarrow CM^2 = \frac{125-45}{4} = 20$

$\Rightarrow CM = 2\sqrt{5}$ cm

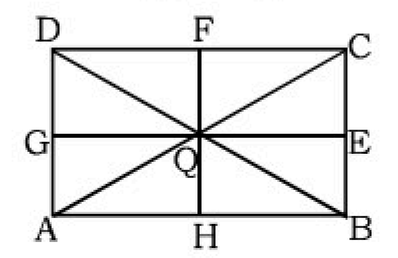
118. (d) According to question



$\angle ABC = \angle DEF$

Note: Two triangles are congurent if two sides and the included angle of one triangle are equal to the corresponding sides and the included angles of the other triangle (SAS criterion).

119. (a) According to question



Given: QA = 3 cm

QB = 4 cm

QC = 5 cm

QD = ?

As we know that

$QD^2 + QB^2 = QA^2 + QC^2$

(By using Pythagoras theorem)

$QD^2 + (4)^2 = (3)^2 + (5)^2$

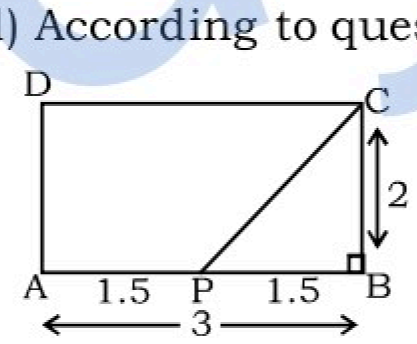
$QD^2 + 16 = 9 + 25$

$QD^2 = 34 - 16$

$QD^2 = 18$

$QD = \sqrt{18}$, $\quad QD = 3\sqrt{2}$

120. (d) According to question



In ΔCBP

$CP^2 = BP^2 + BC^2$

$CP^2 = (1.5)^2 + (2)^2$

$CP^2 = 2.25 + 4$

$CP^2 = 6.25$

$CP = \sqrt{6.25}$

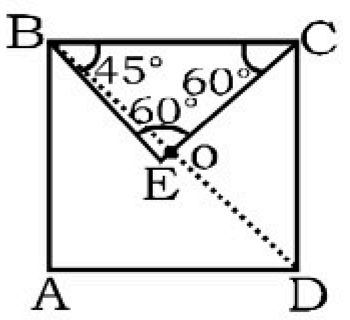
CP = 2.5

$\therefore \text{Sin}\ \angle CPB = \frac{BC}{CP}$

$\text{Sin}\ \angle CPB = \frac{2}{2.5}$

$\text{Sin}\ \angle CPB = \frac{4}{5}$

121. (b) According to question



ABCD is a square and BCE is an equilateral triangle

$\therefore\ \angle CEB = 60°$

If BD is a diagonal

$\therefore\ \angle CBD = 45°$

then In ΔBOC

$\angle CBO + \angle BOC + \angle BCD = 180°$

$\angle BOC = 180° - 60° - 45°$

$\angle BOC = 75°$

122. (a) If the number of sides of regular Polygon be = n

Sum of the interior angles

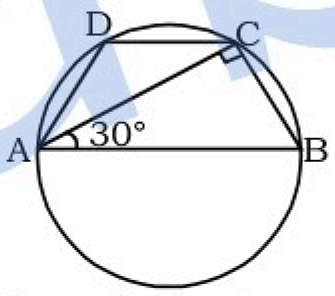
$= (n-2) \times 180°$

$\therefore\ (n-2) \times 180° = 1440°$

$n - 2 = \frac{1440°}{180°}$

$n - 2 = 8,\ n = 10$

123. (b) According to question



Given: AB is a diameter

$\angle CAB = 30°$

As we know that

$\angle ACB = 90°$

$\therefore\ \angle ACB + \angle CAB + \angle CBA = 180°$

$\angle CBA = 180° - 90° - 30°$

$\angle CBA = 60°$

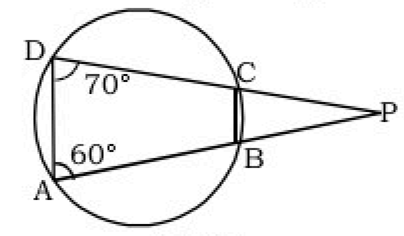
Note: In a cyclic trapezium sum of opposite angle is 180°

$\therefore\ \angle D + \angle B = 180°$

$\angle D = 180° - 60°$

$\angle D = 120°$

124. (a) According to question



$\angle ADC = 70°$

$\angle ABC = 180° - 70° = 110°$

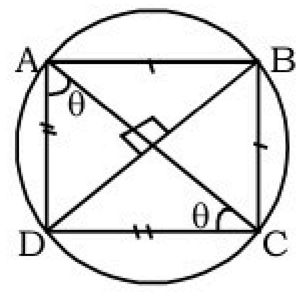
$\Rightarrow\ \angle PBC = 70°$

$\angle BCD = 180° - 60° = 120°$

$\Rightarrow\ \angle PCB = 60°$

$\therefore\ \angle PBC + \angle PCB = 70° + 60° = 130°$

125. (c)According to question



In $\triangle$ADC

$\angle A + \angle D + \angle C = 180°$

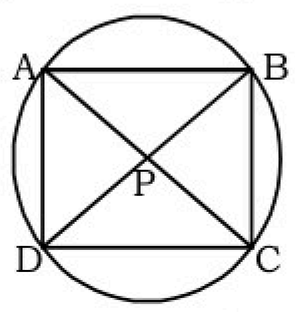
$\angle D = 180° - 2\theta$

$\angle B + \angle D = 180°$

$180° - 2\theta + \angle B = 180°$

$\angle B = 2\theta$

126. (b) According to question

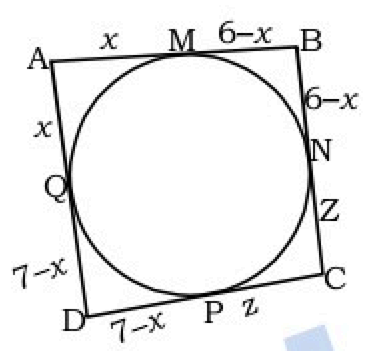


ABCD is a cyclic quadrilateral.

$\therefore$ AP × PC = DP × BP (theorem)

AP. CP = BP.DP

127. (a) According to question



We know tangents drawn to circle from same external point are equal

$\Rightarrow$ AM = AQ = x

$\therefore$ MB = BN = 6 – x

QD = DP = 7 – x

Let NC = PC = z

Now 7 – x + z = 5 (consider side DC)

$-x + z = -2$ ....(i)

BC = $6 - x + z$ ....(ii)

Put the value of equation (i) in equation (ii)

BC = 6 – 2

BC = 4 cm

Alternate

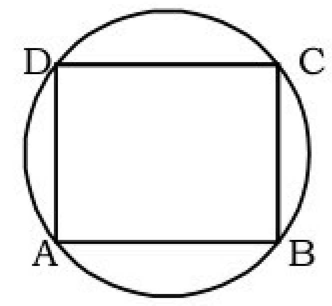
AB + CD = BC + AD

6 + 5 = BC + 7

11 – 7 = BC

4 cm = BC

128. (b)According to question



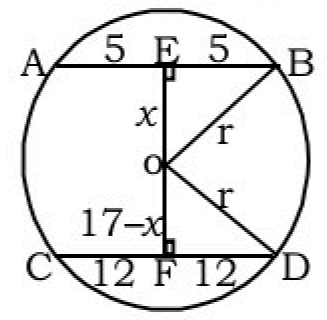
ABCD is a cyclic quadrilateral

$\therefore$ $\angle A + \angle C = 180°$

$\angle B + \angle D = 180°$

$\angle A + \angle B + \angle C + \angle D = 360°$

129. (c) According to question



AE = EB = 5 cm

CF = FD = 12 cm

BO = OD = r cm

$\therefore$ In ΔBOE

$r^2 = x^2 + 5^2$ ....(i)

In ΔDOF

$r^2 = (17 - x)^2 + (12)^2$ ....(ii)

Compare equation (i) and (ii)

$x^2 + 25 = 289 + x^2 - 34x + 144$

$25 = 433 - 34x$

$34x = 408$

$x = 12$ ....(iii)

Put the value of x in equation (i)

$r^2 = (12)^2 + (5)^2$

$r^2 = 144 + 25$

$r^2 = 169$

r = 13 cm

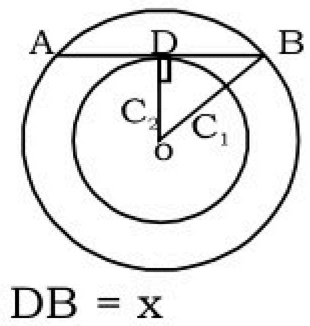
Alternate

Apply triplet

5,12,13

r = 13 cm

130. (c) According to question



AD = DB = x

$C_2 = (\sqrt{3} - 1)$ cm

$C_1 = (\sqrt{3} + 1)$ cm

In ΔBOD

$C_1^2 = C_2^2 + BD^2$

$(\sqrt{3} + 1)^2 = (\sqrt{3} - 1)^2 + x^2$

$4 + 2\sqrt{3} = 4 - 2\sqrt{3} + x^2$

$x^2 = 4\sqrt{3}$

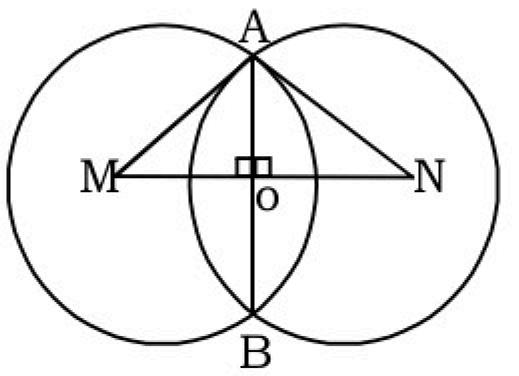
$x = 2\sqrt[4]{3}$

$\therefore$ AB = 2 × BD

AB = $2 \times 2\sqrt[4]{3}$

AB = $4\sqrt[4]{3}$ cm

131. (d) According to question



Let AO = OB = x

MO = y

ON = $50 - y$

AM = 30 cm

AN = 40 cm

In ΔAOM

$AM^2 = OA^2 + OM^2$

$(30)^2 = x^2 + y^2$

$x^2 = 900 - y^2$ .....(i)

In ΔAON

$AN^2 = ON^2 + OA^2$

$(40)^2 = (50 - y)^2 + x^2$

$(x)^2 = 1600 - (50 - y)^2$......(ii)

Compare equation (i) and (ii)

$900 - y^2 = 1600 - (50 - y)^2$

$900 - y^2 = 1600 - (2500 + y^2 - 100y)$

$900 - y^2 = 1600 - 2500 - y^2 + 100y$

$y = 18$ .... (iii)

put the value of y in equation (i)

$x^2 = 900 - 324$

$x^2 = 576$

$x = 24$ cm

OA = 24 cm

AB = 2 × 24

AB = 48 cm

Alternate

30, 40, 50 (triplet)

$\triangle$AMN = Right triangle

$\angle$MAN = 90°

$\triangle AMN = \frac{1}{2} \times b \times h$

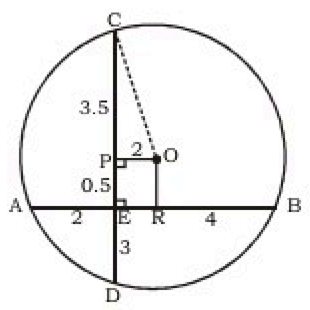
$\frac{1}{2} \times 30 \times 40 = \frac{1}{2} \times 50 \times AO$

AO = 24

AB = 2AO

$\therefore$ AB = 48 cm

132. (a) According to questions



Given:

AE = 2 cm

EB = 6 cm

ED = 3 cm

As we know that

AE × EB = EC × ED

2 × 6 = EC × 3

EC = 4 cm

∴ In $\triangle OPC$

$OC^2 = PO^2 + CP^2$

$r^2 = (2)^2 + \left(\frac{7}{2}\right)^2$

$r^2 = 4 + \frac{49}{4}$

$r^2 = \frac{65}{4}$

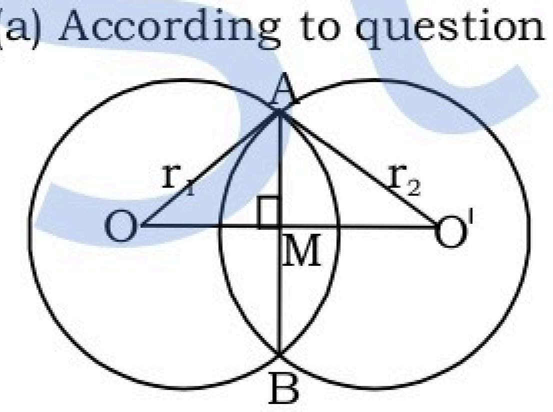
$r = \frac{\sqrt{65}}{2}$

∴ Diameter = 2r

$D = 2 \times \frac{\sqrt{65}}{2}$

$D = \sqrt{65}$

133. (a) According to question



$r_1 = r_2 = 5$ cm

AM = MB = 4 cm

∴ In $\triangle AMO$

$25^2 = OM^2 + AM^2$

$25 = OM^2 + 16$

$OM^2 = 25 - 16$

$OM^2 = 9$

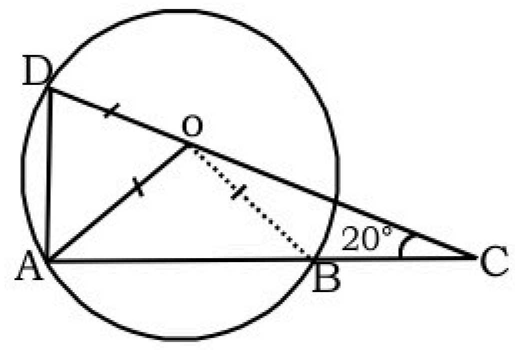
OM = 3 cm

∴ OO' = 2 × OM

OO' = 2 × 3

OO' = 6 cm

134. (d) According to question



BC = DO = OA = OB = r

In $\triangle$ OBC

$\angle OCB = \angle COB = 20°$

In $\triangle$ AOB

$\angle OBA = 20° + 20°$

$\angle OBA = 40°$

$\angle OBA = \angle OAB = 40°$

In $\triangle$ AOB

$\angle A + \angle O + \angle B = 180°$

$40° + \angle O + 40° = 180°$

$\angle O = 100°$

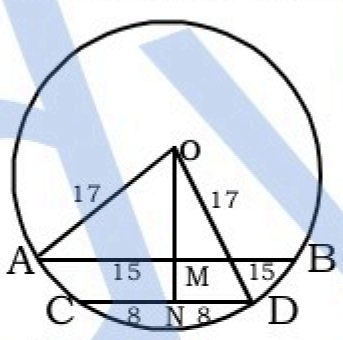
DOC is a line

$\angle COB + \angle AOB + \angle DOA = 180°$

$20° + 100° + \angle DOA = 180°$

$\angle DOA = 60°$

135. (b) According to question



OA = OD = 17 cm

AM = MB = 15 cm

CN = ND = 8 cm

In $\triangle OMA$

$OA^2 = AM^2 + OM^2$

$(17)^2 = (15)^2 + OM^2$

$289 = 225 + OM^2$

$OM^2 = 289 - 225$

$OM^2 = 64$

OM = 8

In $\triangle OND$

$OD^2 = ON^2 + ND^2$

$(17)^2 = (8)^2 + ON^2$

$289 = 64 + ON^2$

$ON^2 = 289 - 64$

$ON^2 = 225$

ON = 15

∴ MN = ON – OM

MN = 15 – 8

MN = 7 cm

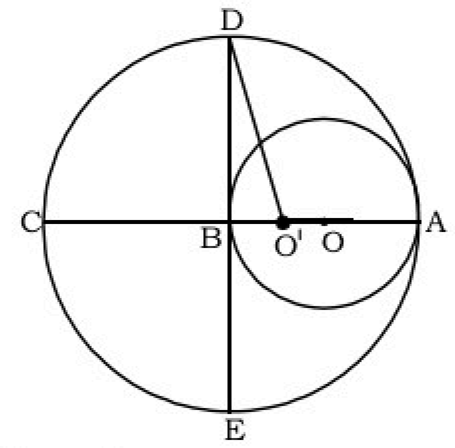
Alternate

17,15,8 (triplet)

distance on same side between chords

= (15 –8) = 7 cm

136. (d) According to question



O'A = 3 cm

OA = 2 cm

O'D = 3 cm

O'B = 1 cm

In $\triangle BDO$

$O'D^2 = DB^2 + BO'^2$

$BD^2 = (3)^2 - (1)^2$

$BD^2 = 9 - 1$

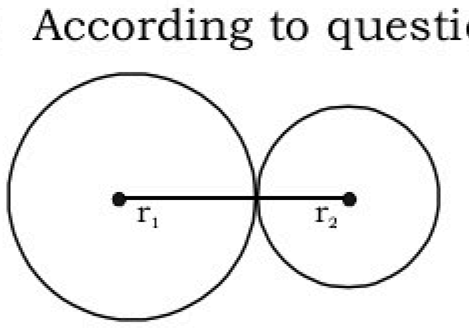
$BD^2 = 8$, $BD = 2\sqrt{2}$

∴ DE = 2 × BD

$DE = 2 \times 2\sqrt{2}$

$DE = 4\sqrt{2}$ cm

137. (b) According to question



Given:

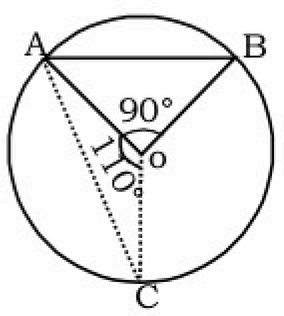
$r_1 + r_2 = 7$ cm

$r_1 = 4$ cm

∴ $r_2 = 7 - 4$

$r_2 = 3$ cm

138. (b) According to question



OA = OB = OC

∴ In $\triangle OAB$

$\angle OAB + \angle OBA + \angle AOB = 180°$

$2\angle OAB = 180° - 90$

$2\angle OAB = 90°$

$\angle OAB = 45°$

In $\triangle OAC$

$\angle OAC + \angle OCA + \angle AOC = 180°$

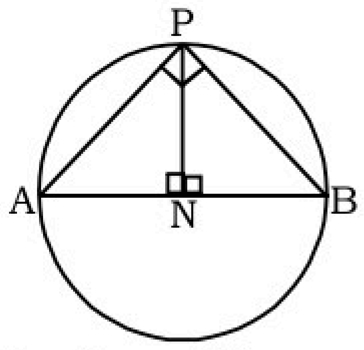
$2\angle OAC = 180°\ 110$

$\angle OAC = 35°$

$\therefore \angle BAC = 45° + 35°$

$= 80°$

139. (d) According to question



AB = 2r = 14 cm

PB = 12 cm

$\angle APB$ = 90° (angle in the semicircle)

Let AN = x and NB = $(14 - x)$

$\therefore$ In $\triangle APB$

$AB^2 = PB^2 + AP^2$

$(14)^2 = (12)^2 + (AP)^2$

$196 = 144 + (AP)^2$

$(AP)^2 = 196 - 144$

$(AP)^2 = 52$

$AP = \sqrt{52}$

In $\triangle APN$

$AP^2 = PN^2 + AN^2$

$\left(\sqrt{52}\right)^2 = x^2 + PN^2$

$PN^2 = 52 - x^2$ ....(i)

In $\triangle PNB$

$PB^2 = PN^2 + NB^2$

$(12)^2 = PN^2 + (14 - x)^2$

$PN^2 = 144 - (14 - x)^2$ ....(ii)

$52 - x^2 = 144 - 196 - x^2 + 28x$

$28x = 104$

$x = \frac{104}{28}$

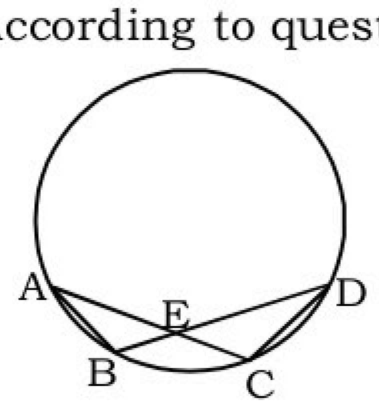
$x = \frac{26}{7}$

$NB = 14 - x$

$NB = 14 - \frac{26}{7}$

$NB = 10\frac{2}{7}$ cm

140. (d) According to question



Given: $\angle BEC = 130°$

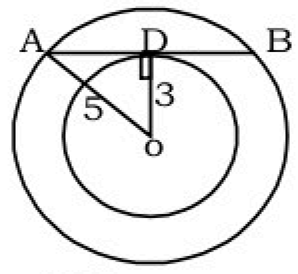
$\Rightarrow \angle DEC = 180° - 130° = 50°$

$\therefore \angle EDC = 180° - 50° - 20 = 110°$

$\therefore \angle BAC = \angle BDC = 110°$

(Angle on the same arc are equal)

141. (d) According to question



Let AD = DB = x

OA = 5 cm

OD = 3 cm

In $\triangle ODA$

$OA^2 = OD^2 + AD^2$

$(5)^2 = (3)^2 + (AD)^2$

$25 = 9 + (AD)^2$

$(AD)^2 = 25 - 9$

$(AD)^2 = 16$

AD = 4

$\therefore$ AB = 2 × AD

AB = 2 × 4 = 8 cm

Alternate

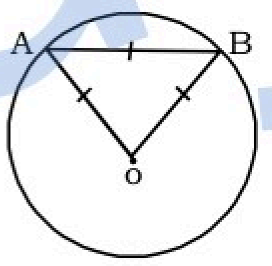
In $\triangle$ AOD, 3,4,5 (triplet)

AD = 4 cm

AB = 2AD

= 2 × 4 = 8 cm

142. (b) According to question



Let AB is the chord and 'O' is the centre of a circle

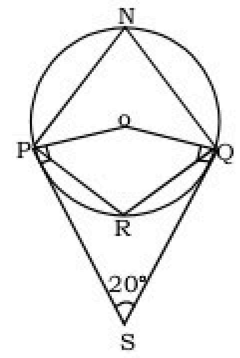
Given:

OA = OB = AB

$\therefore$ All sides are equal then triangle is equilateral triangle.

$\therefore$ Then the angle subtended by the chord is 60°

143. (d) According to question,



Given: $\angle PSQ = 20°$

$\angle PRQ = ?$

OPSQ is a quadrilateral

$\angle OPS = \angle OQS = 90°$

$\therefore \angle OPS + \angle OQS + \angle POQ + \angle QSP$

$= 360°$

$\angle OPS + \angle OQS + \angle POQ + \angle QSP$

$= 360° - 90° - 90° - 20°$

$\angle POQ = 160°$

$\therefore \angle PNQ = \frac{1}{2}\angle POQ$

$\angle PNQ = \frac{1}{2} \times 160° = 80°$

$\therefore$ NPRQ is a cyclic quadrilateral

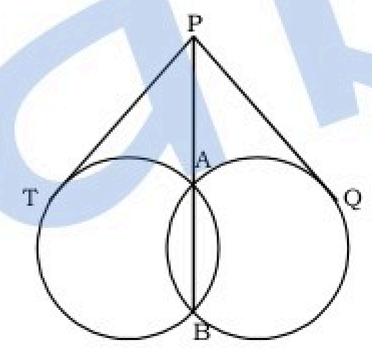
$\therefore$ sum of opposite angles of cyclic quadrilateral is 180°

$\therefore \angle PNQ + \angle PRQ = 180°$

$\angle PRQ = 180° - 80°$

$\angle PRQ = 100°$

144. (d) According to question



As shown in the figure Tangent are equal

$\therefore$ PT = PQ

Alternate

$PQ^2 = PA \times PB$ ..... (i)

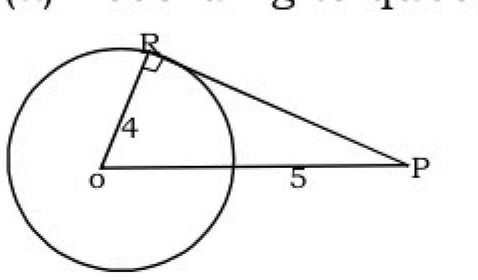
$PT^2 = PA \times PB$ .....(ii)

From both equation,

$PT^2 = PQ^2$

PT = PQ

145. (a) According to question



$\triangle ORP$ is a right angle triangle

$\therefore$ By using pythagoras theorem.

$OP^2 = OR^2 + RP^2$

$(5)^2 = (4)^2 + (RP)^2$

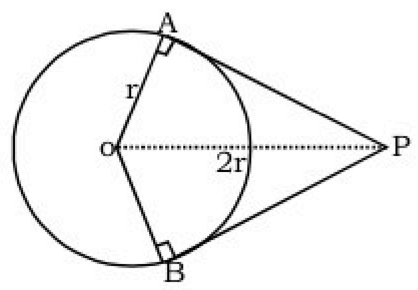
$25 = 16 + (RP)^2$

$(RP)^2 = 25 - 16$

$(RP)^2 = 9$

RP = 3 cm

146. (d) According to question



Given: OA = OB = r.(radius)

OP = 2r (diameter)

In $\triangle OAP$

$OP^2 = OA^2 + AP^2$

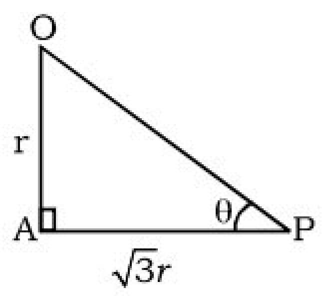
$(2r)^2 = r^2 + AP^2$

$AP^2 = 4r^2 - r^2$

$AP^2 = 3r^2$

$AP = \sqrt{3}r$

In $\triangle OAP$



$\tan\theta = \frac{OA}{AP}$ $\tan\theta = \frac{r}{\sqrt{3}r}$

$\tan\theta = \frac{1}{\sqrt{3}}$ $\tan 30° = \frac{1}{\sqrt{3}}$

$\therefore \angle OPA = 30°$

Similarly in $\angle OPB$

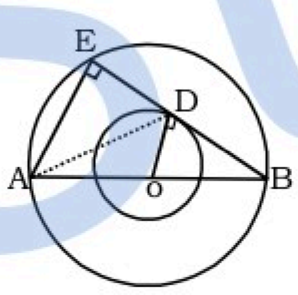
$\therefore \angle OPB = 30°$

$\therefore \angle APB = \angle OPA + \angle OPB$

$\angle APB = 30° + 30°$

$\angle APB = 60°$

147. (b) According to question



Given: OA = OB = 13 cm

OD = 8 cm

$\therefore$ AE = 2× OD

AE = 2 × 8 = 16 cm

In $\triangle ODB$

$OB^2 = OD^2 + BD^2$

$BD^2 = OB^2 - OD^2$

$BD^2 = (13)^2 - (8)^2$

$BD^2 = 169 - 64$

$BD^2 = 105$

$BD = \sqrt{105}$ cm

$\therefore DE = BD = \sqrt{105}$ cm

$\therefore$ In $\triangle AED$

$AD^2 = DE^2 + AE^2$

$AD^2 = \left(\sqrt{105}\right)^2 + (16)^2$

$AD^2 = 105 + 256$

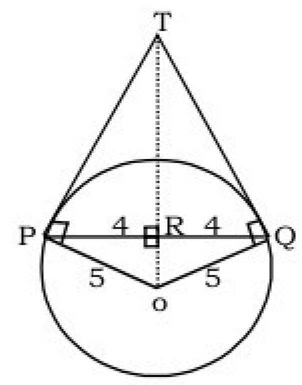
$AD^2 = 361$

AD = 19 cm

148. (a) According to question

OT is the perpendicular bisector of chord PQ.

let TR = y



In right angle $\triangle PRO$

$PO^2 = PR^2 + RO^2$

$(5)^2 = (4)^2 + RO^2$

$(RO)^2 = 25 - 16$

$(RO)^2 = 9$, RO = 3 cm

Right angle $\triangle TPO$ and $\triangle TRP$

$TO^2 = PT^2 + OP^2$ ....(i)

$PT^2 = TR^2 + PR^2$ ....(ii)

Put the value of PT^2 in equation (i)

$TO^2 = TR^2 + PR^2 + OP^2$

$(y + 3)^2 = y^2 + (4)^2 + (5)^2$

$y^2 + 9 + 6y = y^2 + 16 + 25$

$9 + 6y = 41$, $6y = 32$

$y = \frac{32}{6} = \frac{16}{3}$ cm

In right angle $\triangle TRP$

$PT^2 = TR^2 + PR^2$

$PT^2 = \left(\frac{16}{3}\right)^2 + (4)^2$

$PT^2 = \frac{256}{9} + 16$

$PT^2 = \frac{400}{9}$, $PT = \frac{20}{3}$ cm

Alternate

In $\triangle$ POR,

$OP^2 = OR^2 + PR^2$

$5^2 = OR^2 + 4^2$

$OR^2 = 25 - 16 = 9$

$\Rightarrow$ OR = 3cm

In $\triangle$ POR and $\triangle$ POT

$\angle PRO = \angle TPO$ (each 90°)

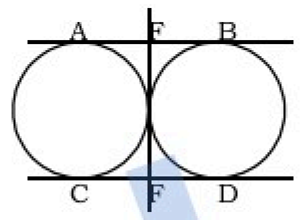
$\Rightarrow \triangle POR \sim \triangle POT$

$\Rightarrow \frac{PR}{PT} = \frac{OR}{OP}$

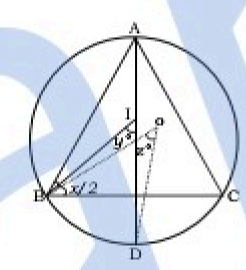
$\Rightarrow \frac{4}{PT} = \frac{3}{5}$

$\Rightarrow PT = \frac{20}{3}$

149. (c) Maximum no. of tangent are 3



150. (c) According to question



Given: $\angle ABC = x°$

$\angle BID = y°$, $\angle BOD = z°$

$\therefore$ 'I' is the incentre

$\therefore \angle ABI = \frac{1}{2}\angle ABC$

$\angle ABI = \frac{1}{2}x° = \frac{x°}{2}$

$\angle BAD = \frac{1}{2}\angle BOD$

$\therefore$ Angle subtended on the circumcircle is half the angle subtended on the centre of circle.

$\angle BAD = \frac{1}{2}\angle BOD$

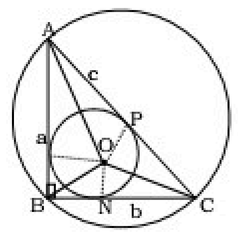
$\angle BAD = \frac{z°}{2}$

$\therefore y° = \frac{x°}{2} + \frac{z°}{2}$ (Exterior angle)

$\therefore y° = \frac{x° + z°}{2}$

$2 = \frac{z° + x°}{y°}$

151. (b) According to question



Given:

PC = 15 cm = I_R(circumradius)

ON = 6 cm = I_r (Inradius)

As we know that

$I_R = \frac{AC}{2}$,

AC = 2 × I_R = 2 × 15 = 30 cm

and $I_r = \frac{a+b-c}{2}$

$a + b - c = 2I_r$

a + b – c = 12

a + b = 12 + c

a + b = 12 + 30

a + b = 42 cm

Now check the option, only one option is satisfied

option:(b) Here a = 18

b = 24

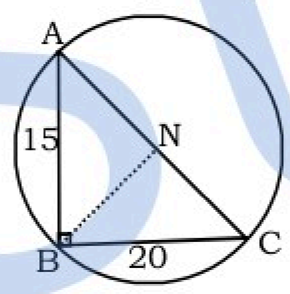
c = 30

a + b = 18 + 24

= 42 cm

c = 30 cm

152. (d) According to question



Given: AB = 15 cm

BC = 20 cm

Let BN = I_R

In right angle $\triangle ABC$

By using pythagoras theorem

$AC^2 = AB^2 + BC^2$

$AC^2 = 15^2 + 20^2$

$AC^2 = 225 + 400$

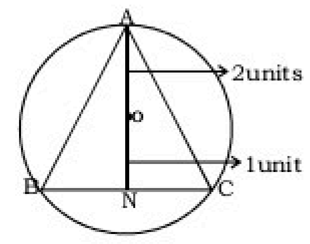
$AC^2 = 625$, AC = 25

As we know that circumradius

$I_R = \frac{H}{2}$, *i.e*, $\frac{AC}{2}$

$\therefore$ $I_R = \frac{25}{2}$ = 12.5 cm

153. (d) According to question



Given:

$\triangle ABC$ is an equilateral $\triangle$

AO = IR =8 (circumradius)

ON = Ir = (Inradius)

Height of triangle

AN = 3 units

$\therefore$ 2 units = AO

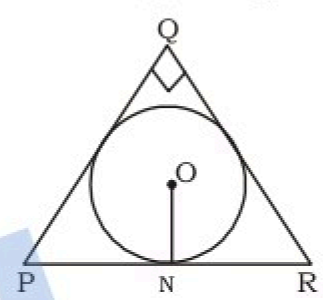
2 units = 8

1 unit = $\frac{8}{2}$

3 units = $\frac{8}{2} \times 3$ = 12 cm

$\therefore$ AN = 12 cm

154. (d) According to question



In right angle $\triangle PQR$

PQ = 3 cm

QR = 4 cm

$\therefore$ By using Pythagoras theorem

$PR^2 = PQ^2 + QR^2$

$PR^2 = (3)^2 + (4)^2$

$PR^2 = 9 + 16$

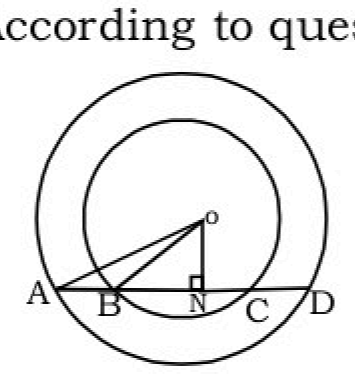
$PR^2 = 25$

PR = 5 cm

let ON = I_r = Inradius of the circle as we know that

$I_r = \frac{B+P-H}{2} = \frac{3+4-5}{2}$ = 1 cm

155. (c) According to question



Given:

BC = 12 cm, OA = 17 cm

OB = 10 cm

$\therefore$ BN = NC = 6 cm

$\therefore$ In right angle $\triangle ONB$

$OB^2 = ON^2 + BN^2$

$(10)^2 = ON^2 + (6)^2$

$ON^2 = 100 - 36$

$ON^2 = 64$

ON = 8 cm

In right angle $\triangle ONA$

$OA^2 = ON^2 + AN^2$

$(17)^2 = (8)^2 + AN^2$

$AN^2 = 289 - 64$

$AN^2 = 225$

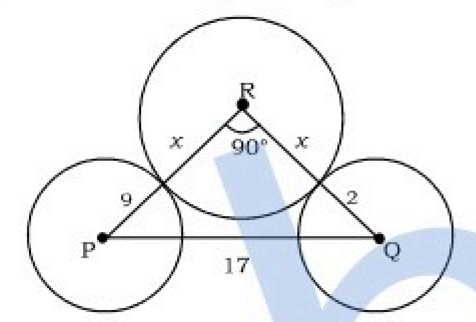
AN = 15 cm

AD = 2 × AN

$\therefore$ AD = 15 × 2

AD = 30 cm

156. (b) According to question



Given: PQ = 17 cm

$\angle PRQ = 90°$

In right angle $\triangle$ PQR

By using pythagoras theorem

$PQ^2 = PR^2 + RQ^2$

$(17)^2 = (9 + x)^2 + (2 + x)^2$

$289 = 81 + x^2 + 18x + 4 + x^2 + 4x$

$2x^2 + 22x - 204 = 0$

$x^2 + 11x - 102 = 0$

$x^2 + 17x - 6x - 102 = 0$

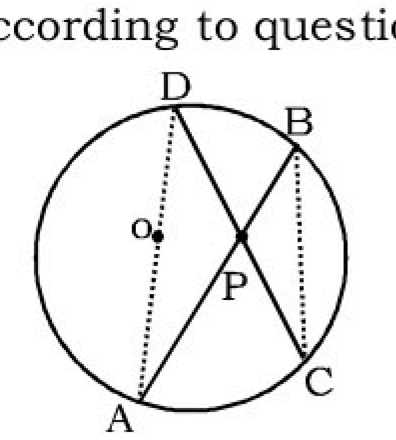
$x(x + 17) - 6(x + 17) = 0$

$(x + 17)\ (x - 6) = 0$

$\therefore x = 6$ and $x \neq -17$

$\therefore x = 6$ cm

157. (b)According to question



$\angle ADP = \angle ABC = 23°$

$\angle APC = 70° = \angle DPB$

$\therefore \angle APD = 180° - 70°$

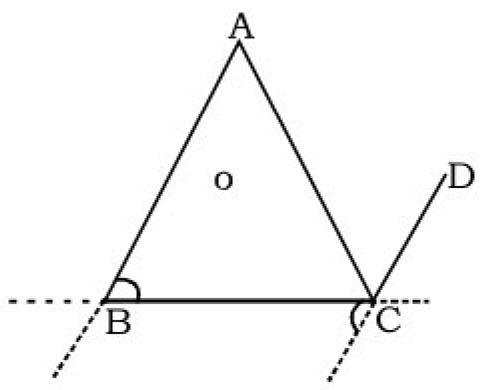
$110° = \angle BPC$

Also

$\angle BCD = 180° - 23° - 110°$

$= 47°$

158. (a)According to question



Given: $\angle A + \angle B + \angle C = 180°$

$2 + 3 + 4 = 9$ units

$\therefore$ 9 units = 180°

1 unit = 20°

$\therefore \angle A = 2 \times 20° = 40°$

$\angle B = 3 \times 20° = 60°$

$\angle C = 4 \times 20° = 80°$

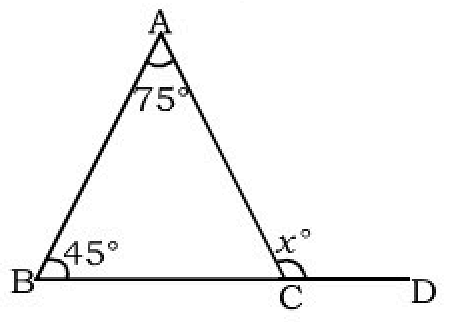
and AB | | CD

$\angle B = \angle C$

$\therefore \angle ACD = 180° - 60° - 80°$

$\angle ACD = 40°$

159. (d) According to question



Given: $\angle A = 75°$

$\angle B = 45°$

$\therefore \angle ACD = \angle A + \angle B$

$x° = \angle ACD = 120°$

Now, $\frac{x}{3}\%$ of 60° is

$= \frac{120}{3}\%$ of 60°

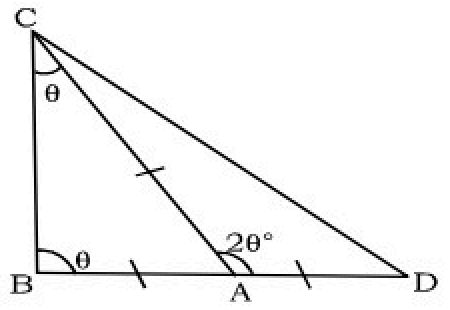
= 40% of 60°

$= \frac{40}{100} \times 60°$

= 24°

160 (d) According to question

ABC is an isosceles triangle.



$\therefore \angle C = \angle B = \theta$

$\therefore \angle CAD = \angle C + \angle B$

$\angle CAD = \theta + \theta$

$\angle CAD = 2\theta$

ADC is a isosceles triangle

$\angle C + \angle D + \angle A = 180°$

$2\angle C = 180° - 2\theta°$

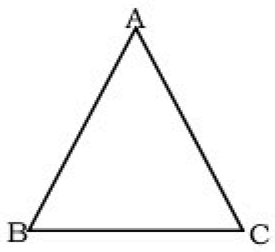
$(\angle C = \angle D)$

$\angle C = 90° - \theta$

$\therefore \angle BCD = \theta + 90 - \theta$

$\angle BCD = 90°$

161 (b) According to question



Given: $\angle A + \angle B = 65°$

$\angle B + \angle C = 140°$

We know that

$\angle A + \angle B + \angle C = 180°$

$\angle C = 180° - (\angle A + \angle B)$

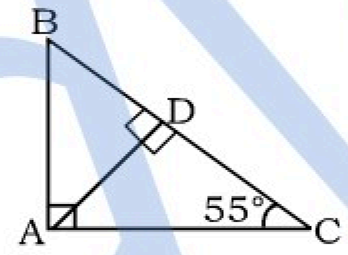
$\angle C = 180° - 65°$

$\angle C = 115°$

$\angle B = 140° - 115°$

$\angle B = 25°$

162. (d) According to question



In right angle ΔBAC

$\angle A + \angle B + \angle C = 180°$

$\angle B = 180° - 55° - 90°$

$\angle B = 35°$

In right angle ΔADB

$\angle ADB + \angle ABD + \angle BAD = 180°$

$\angle BAD = 180° - 35° - 90°$

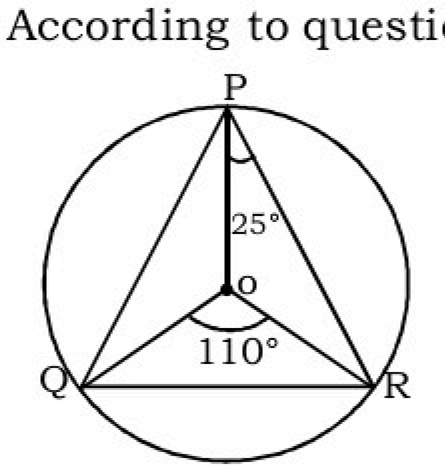
$\angle BAD = 55°$

Alternate

$\Delta BAC \sim \Delta BDA$

$\therefore \angle BCA = \angle BAD = 55°$

163. (d) According to question



Given: $\angle QOR = 110°$

$\angle OPR = 25°$

'O' is the circumcentre then

OP = OR = OQ

$\because \angle OPR = \angle ORP = 25°$

In ΔOQR

$\angle OQR + \angle ORQ + \angle QOR = 180°$

$2\angle ORQ = 180° - 110°$

$2\angle ORQ = 70°$

$\angle ORQ = \frac{70°}{2}$

$\angle ORQ = 35°$

$\therefore \angle PRQ = \angle PRO + \angle ORQ$

$\angle PRQ = 60°$

164. (c) According to figure

$\angle DAC = 51°$

$\angle EOB = 180° - 150° = 30°$

OB = OE = radius

$\therefore \angle OEB = \angle OBE$

then

$\angle OEB + \angle OBE + \angle EOB = 180°$

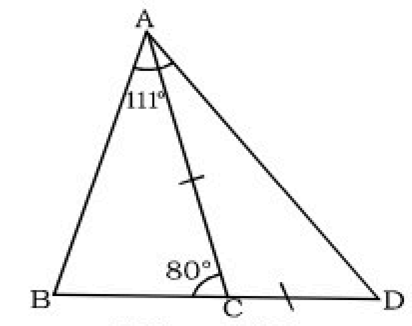
$2\angle OBE = 180° - 30°$

$\angle OBE = 75°$

$\therefore \angle CBE = 180° - 75°$

$\angle CBE = 105°$

165. (d) According to question



Given: AC = CD

$\angle BAD = 111°$

$\angle ACB = 80°$

$\therefore \angle ACD = 180° - 80°$

$\angle ACD = 100°$

In isosceles triangle ACD

$\angle ACD + \angle CAD + \angle ADC = 180°$

$2\angle CAD = 180° - 100°$

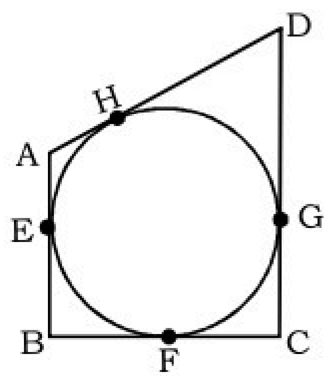
$\angle CAD = 40°$

$\therefore \angle CAB = 111° - 40° = 71°$

$\therefore \angle ABC = 180° - 71° - 80°$

$\angle ABC = 29°$

166. (d) According to question



AE = AH ....(i)

BE = BF ....(ii)

DG = DH.....(iii)

GC = FC ......(iv)

Add equation (i) ,(ii),(iii) and (iV)

AE + BE + DG + GC = AH +BF + DH + FC

AB + CD = AD + BC

$\therefore$ 6 + 3 = AD + 7.5

AD = 9 – 7.5 = 1.5 cm

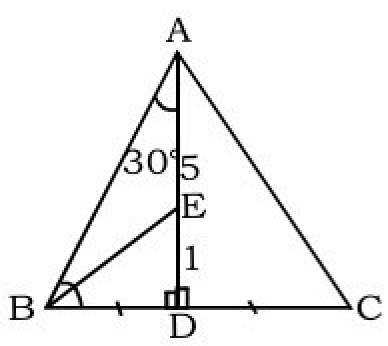
Alternate

AB + CD = DA + BC

6 + 3 = 7.5 + DA

DA = 1.5 cm

167. (c) According to question



$\angle BAD = 30°$

$\angle ABD = 180° - 90° - 30°$

$\angle ABD = 60°$

$$\frac{\tan \angle ACB}{\tan \angle DBE} = \frac{AD}{DC} \times \frac{BD}{DE} = 6$$

$$\frac{6}{DC} \times \frac{BD}{1} = 6$$

BD = DC

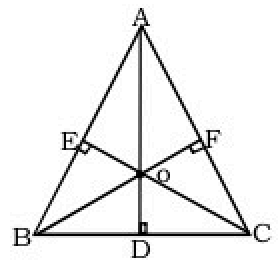
Hence AB = AC,

$\therefore \angle ACB = 60°$

Note: In isosceles triangle altitude divides the opposite side in two equal parts.

168. (d) According to question

O is Orthocentre.



169. (c)According to question

$$\frac{\angle ABC}{\angle ACB} = \frac{5}{1}, \frac{\angle BAC}{\angle ACB} = \frac{3}{1}$$

$\therefore \angle ABC : \angle ACB : \angle BAC$

5 1 3

As we know that

$\angle ABC + \angle ACB + \angle BAC = 180°$

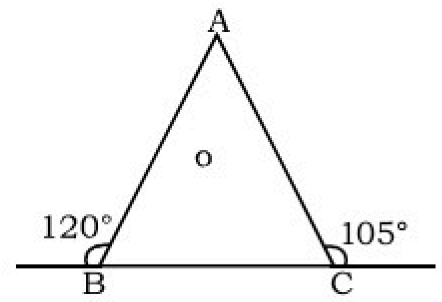
$\therefore$ 9 unit = 180°

1 unit = 20°

$\therefore \angle ABC = 5 \times 20°$

$= 100°$

170. (c) According to question



$\angle ABC = 180° - 120°$

$\angle ABC = 60°$

$\angle ACB = 180° - 105°$

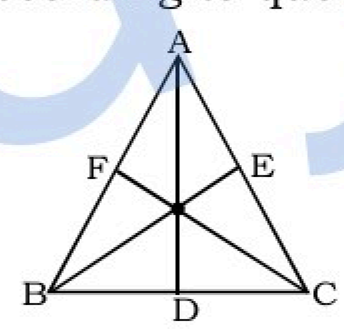
$\angle ACB = 75°$

$\therefore \angle ABC + \angle ACB + \angle BAC = 180°$

$\angle BAC = 180° - 75° - 60°$

$\angle BAC = 45°$

171. (a) According to question



Points D, E, F are midpoints of BC,CA and AB.

$\therefore$ AB + AC > 2AD ....(i)

AB + BC > 2 BE .....(ii)

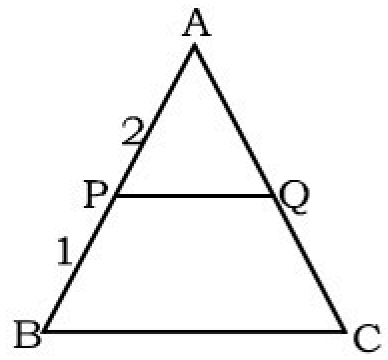
BC + CA> 2CF ......(iii)

Adding to equation (i),(ii) and (iii) we get

2(AB + BC + CA) > 2(AD + BE + CF)

$\therefore$ (AB + BC + CA) > (AD + BE + CF)

172. (d) According to question

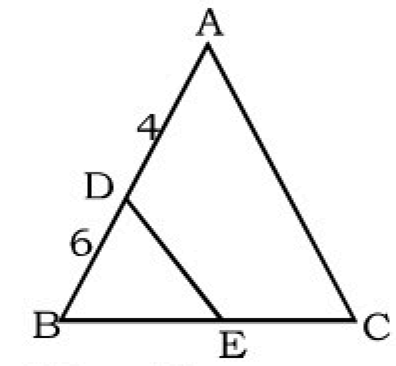


Given: $\frac{AB}{PB} = \frac{3}{1}$

To apply B.P.T $\frac{AP}{AB} = \frac{AQ}{AC} = \frac{PQ}{BC}$

$\frac{PQ}{BC} = \frac{2}{3}$

173. (d) According to question



Given: AB = 10 cm

AD = 4 cm

DE||AC

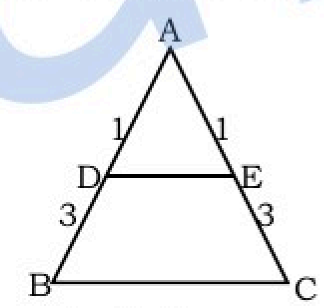
$\Delta ABC \sim \Delta DBE$

$\therefore \frac{BD}{AD} = \frac{BE}{CE}$

$\frac{BE}{CE} = \frac{6}{4}$

$\frac{BE}{CE} = \frac{3}{2}$

174. (c) According to question



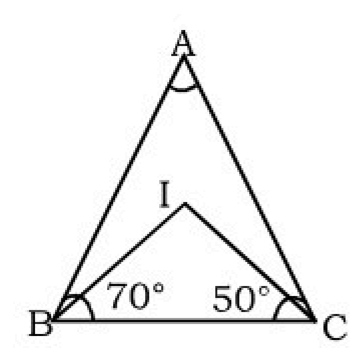
By using B.P.T

$\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$

$\frac{AD}{AB} = \frac{DE}{BC}, \frac{1}{4} = \frac{DE}{12}$

DE = 3 cm

175. (c) According to question



As we know that

$\angle A + \angle B + \angle C = 180°$

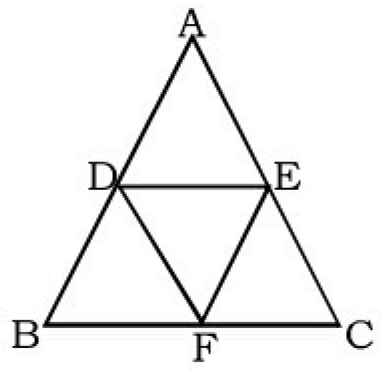
$\therefore \angle A = 180° - 70° - 50°$

$\angle A = 60°$

$\therefore \angle BIC = 90° + \frac{1}{2} \times 60°$

$\angle BIC = 120°$

176. (b) According to question



As we know that

Given: area of $\triangle$ ABC

= 24 square. units

As we know that

D,E and F are the midpoint of AB, AC and BC

$\therefore$ Area of $\triangle$ ADE = area of $\triangle$ DBF

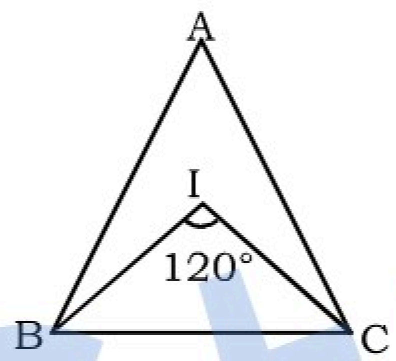
= area of $\triangle$ DEF = area of $\triangle$ EFC

$\therefore$ Area of $\triangle$ DEF = $\frac{1}{4}$ area of $\triangle$ ABC

Area of $\triangle$ DEF = $\frac{1}{4} \times 24 = 6$ sq. units

177. (d) The angle in a semi-circle is a right angle

178. (c) According to question



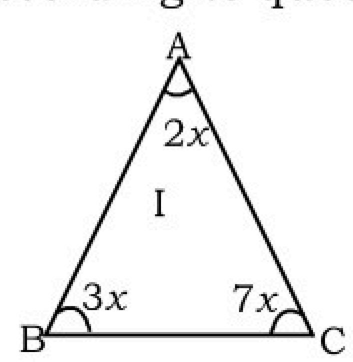
Given: $\angle BIC$ = 120°

$\angle BIC = 90° + \frac{1}{2}\angle A$

$\frac{\angle A}{2} = (120° - 90°)$

$\frac{\angle A}{2} = 30°$ $\angle A = 60°$

179. (a) According to question



Let angles are $2x$,$3x$ and $7x$.

$\angle A + \angle B + \angle C = 180°$

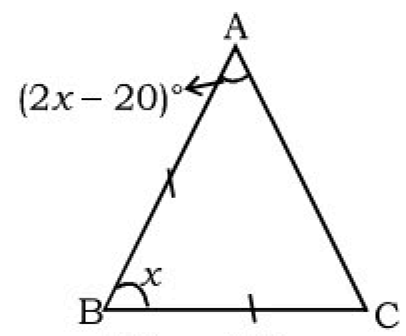
$2x + 3x + 7x = 180°$

$12x = 180°$

x = 15°

$\therefore$ Smallest angle is = 2 × 15° = 30°

180. (d) According to question



Given : AB = AC

$\angle C = \angle A = 2x - 20°$

$\angle B$ = x°

As we know that

$\angle A + \angle B + \angle C = 180°$

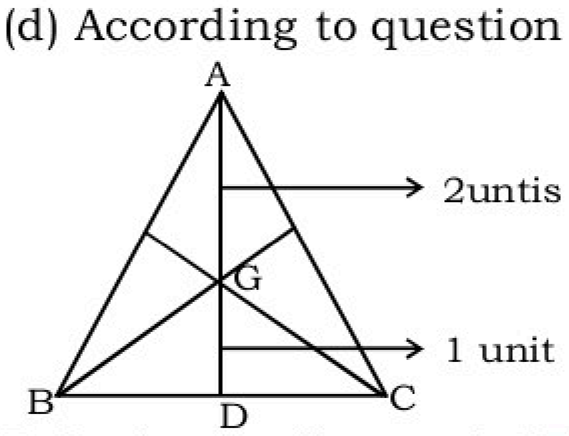
$(2x - 20)° + x + (2x - 20)° = 180°$

$5x = 220°$

$x = 44°$

$\therefore \angle B = 44°$

181. (d) According to question



AD is the median and G is the centroid of the triangle.

As we know that centroid divides the median in 2 : 1

$\therefore \quad \frac{AG}{AD} = \frac{2}{3}$

182. (c) As we know that sum of supplementary angles is 180°

Ratio of supplementary angle is

$= \frac{2}{3}$

5 units = 180°

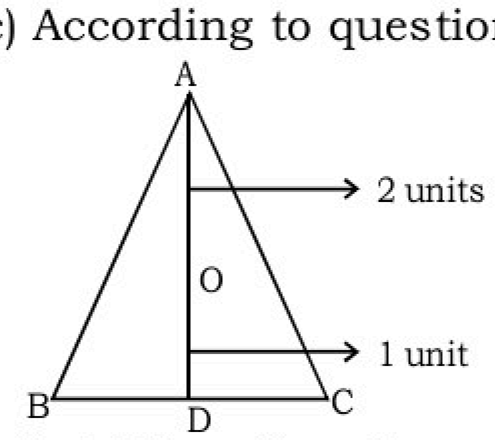
1 unit = $\frac{180}{5}$ = 36°

$\therefore$ Supplementary angle

= 36°× 2 = 72°

and 36°× 3 = 108°

183. (c) According to question



Let AO = 2 units

OD = 1 unit

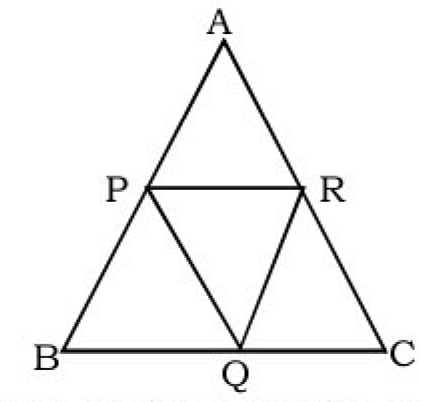
Given: AO = 10 cm

$\therefore$ 2 units = 10 cm

1 unit = 5 cm

$\therefore$ OD = 5 cm

184. (a) According to question



Given: P,Q and R are the mid points of AB, BC and AC

PQ||AC and PQ = $\frac{1}{2}$ AC

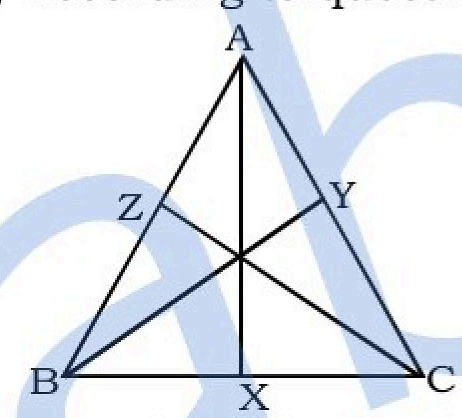
PR||BC and PR = $\frac{1}{2}$ BC

RQ|| AB and RQ = $\frac{1}{2}$ AB

(mid point threom)

$\therefore \Delta PQR$ is an equilateral triangle.

185. (a) According to question



In an equilateral triangle

AB = BC = AC

$\angle A = \angle B = \angle C = 60°$

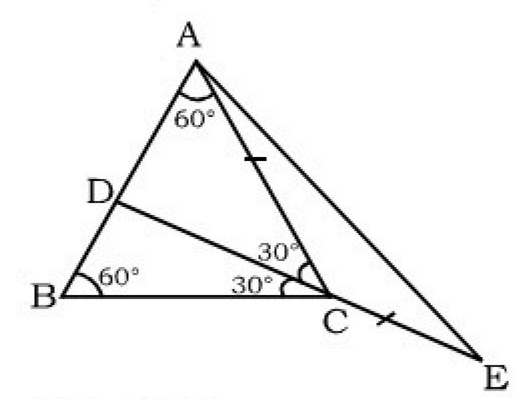
$\therefore$ AX = BY = CZ

(All altitudes are same in an equilateral triangles)

186. (d) According to question

Given: ABC is an equilateral triangle

CD is the angle bisector of $\angle C$



AC = CE

$\therefore \quad \angle CAE = \angle CEA$

$\angle ACD = 30°$

$\therefore \quad \angle ECA = 180° - 30°$

= 150°

In ΔCAE

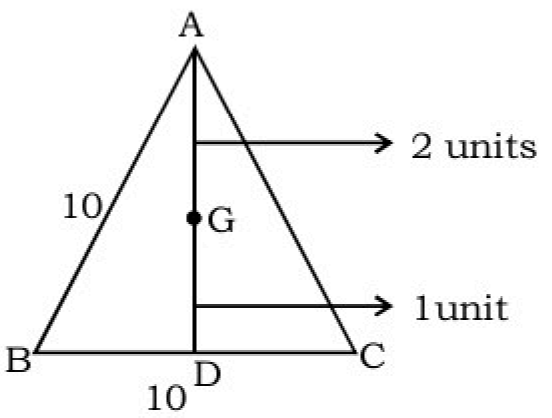
$\angle CAE + \angle CEA + \angle ECA = 180°$

$\therefore \quad 2\angle CAE = 180° - 150°$

$2\angle CAE = 30°$

$\angle CAE = 15°$

187. (b) According to question



Given: AB = BC = CA = 10 cm

G = Centroid

AG = 2 units

GD = 1 unit

$\therefore$ AD = 3 units = Height

As we know that the height of the equilateral triangle is

$= \frac{\sqrt{3}}{2} \times 10 = 5\sqrt{3}$

$\therefore$ 3 units = $5\sqrt{3}$

1 unit = $\frac{5\sqrt{3}}{3}$

2 units = $\frac{5\sqrt{3}}{3} \times 2 = \frac{10\sqrt{3}}{3}$

$\therefore$ AG = $\mathbf{\frac{10\sqrt{3}}{3}}$ cm

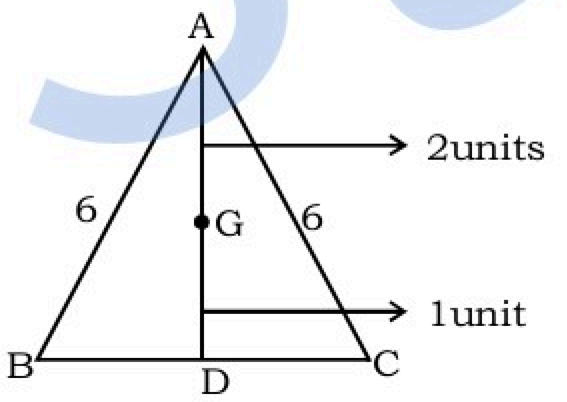
Alternate

AG (r_c) = $\frac{AB(a)}{\sqrt{3}}$

AG = $\frac{10}{\sqrt{3}}$

$= \frac{10\sqrt{3}}{3}$ cm

188. (b) According to question



Given: AB = BC = CA = 6 cm

AG = I_R = Circumradius = 2 units

GD = I_r = Inradius = 1 unit

AD = height = 3 units

As we know that height of the equilateral tirangle is $\frac{\sqrt{3}}{2}a$, where'a' is the sides of a triangle

AD = $\frac{\sqrt{3}}{2} \times 6 = 3\sqrt{3}$ cm

$\therefore$ 3 units = $3\sqrt{3}$

1 unit = $\frac{3\sqrt{3}}{3} = \sqrt{3}$

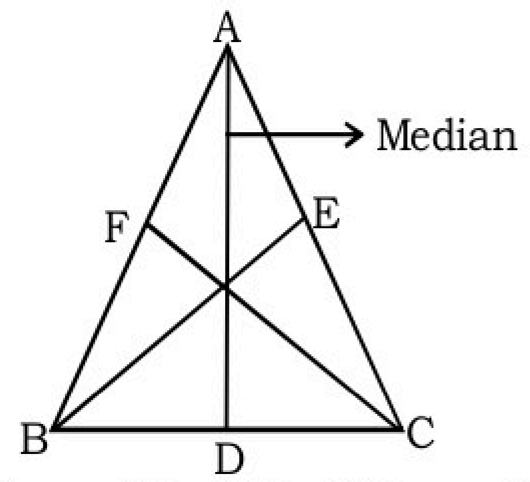
$\therefore$ GD = I_r = $\mathbf{\sqrt{3}}$

Alternate

$r_{in} = \frac{a}{2\sqrt{3}}$

$r_{in} = \frac{6}{2\sqrt{3}} = \sqrt{3}$ cm

189. (a) According to question

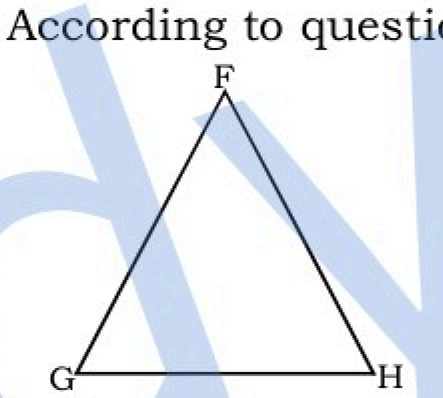


Given: AD = BE = CF = median then

AB = BC = CA

$\therefore$ The triangle is an equilateral triangle.

190. (a) According to question



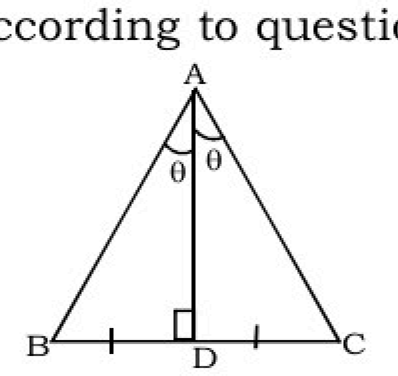
FG < 3 cm

GH = 8 cm

Note: The sum of two sides of a triangle is greater than its third sides

$\therefore$ FH = GH

191. (c)According to question

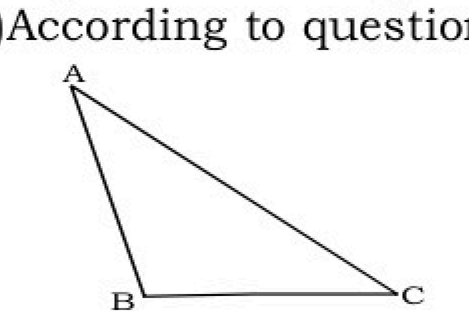


AB = AC

BD = DC

The triangle will be isosceles and equilateral triangle

192. (c)According to question



Given: $\angle A$ = 21°, $\angle C$ = 38°

As we know that

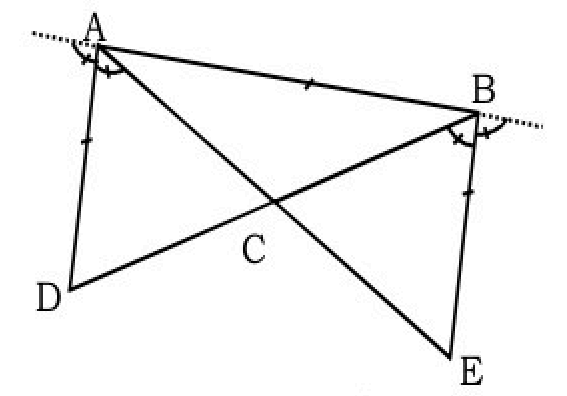
$\angle A + \angle B + \angle C$

$\angle B$ = 180° – 21° – 38°

$\angle B$ = 121°

$\therefore$ The triangle is obtuse-angled triangle.

193. (b)According to question



Let $\angle$CAB = x and $\angle$CBA = y

$\Rightarrow \angle CAD = \frac{180 - x}{2} = 90 - \frac{x}{2}$

and $\angle EBC = \frac{180 - y}{2} = 90 - \frac{y}{2}$

also $\angle$AEB = $\angle$EAB = x

($\because$ AB = EB $\Rightarrow$ ABE is an isoceles triangle)

and $\angle$ADB = $\angle$ABD = y ($\because$ AB = AD $\Rightarrow$ ADB is an isoceles triangle)

In ΔAEB,

$\angle$AEB + $\angle$ABE + $\angle$BAE = 180°

$x + x + y + 90 - \frac{y}{2} = 180°$

$\Rightarrow 4x + y = 180°$

Similarly in ΔADB

$4y + x = 180°$

$\Rightarrow 4y + x + 4x + y = 180 + 180$

$\Rightarrow 5x + 5y = 360°$

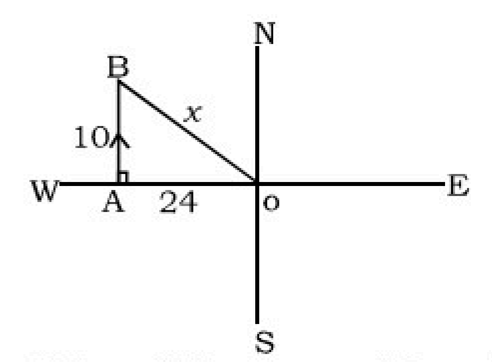
$\Rightarrow x + y = 72°$

In triangle ABC,

$\angle$ACB + x + y = 180°

$\Rightarrow \angle$ACB = 180 – 72 = 108°

194. (b) According to question



Given : OA = 24 cm AB = 10 m

Let OB = x m

In right angle ΔOAB

By using pythagoras theorem

$OB^2 = OA^2 + AB^2$

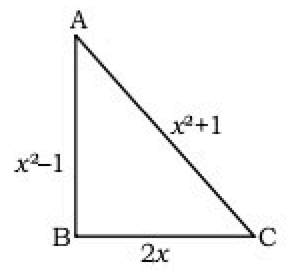
$OB^2 = (10)^2 + (24)^2$

$OB^2 = 100 + 576$

$OB^2 = 676$

OB = 26m

195. (c) According to question



Sides AB = $x^2 - 1$

BC = $2x$

AC = $x^2 + 1$

By using pythagoras theorem

$AC^2 = AB^2 + BC^2$

$(x^2 + 1)^2 = (x^2 - 1)^2 + (2x)^2$

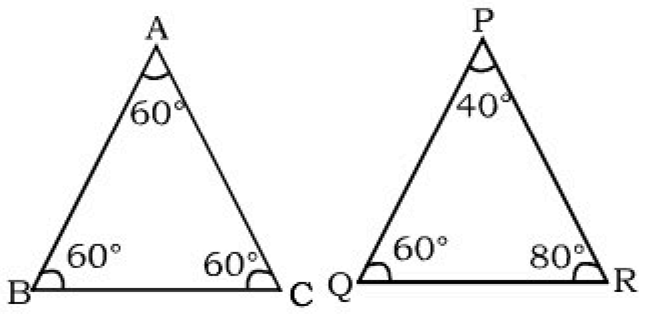
$x^4 + 1 + 2x^2 = x^2 + 1 - 2x^2 + 4x^2$

$(x^2 + 1)^2 = (x^2 + 1)^2$

$\therefore$ The triangle is right angle $\triangle$

196. (b) According to question

In equilateral triangle



$\angle A + \angle B > \angle C$

$60° + 60° > 60°$

$120° > 60°$

In acute angle triangle

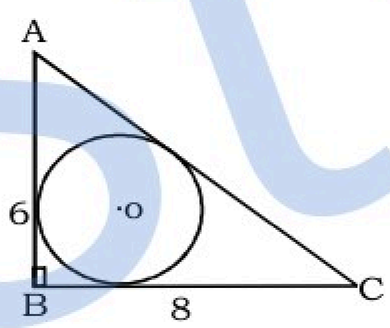
$\angle P + \angle Q > \angle R$

$60° + 40° > 80°$

$100° > 80°$

197. (b) According to question

Given :



AB = 6 cm, BC = 8 cm

In right angle $\triangle ABC$

By using pythagoras theorem

$AC^2 = AB^2 + BC^2$

$AC^2 = (6)^2 + (8)^2$

$AC^2 = 36 + 64$

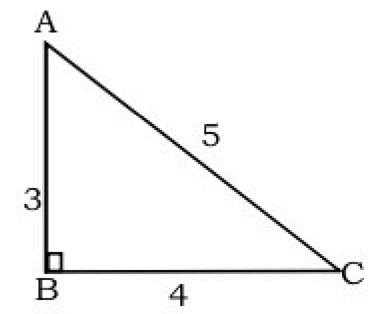
$AC^2 = 100$

AC = 10 cm

In radius = $\frac{a + b - c}{2}$

$= \frac{8 + 6 - 10}{2} = \frac{4}{2} = 2$ cm

198. (a) According to question



ABC is a right angle triangle

By using pythagoras theorem

$AC^2 = BC^2 + AB^2$

$(5)^2 = (3)^2 + (4)^2$

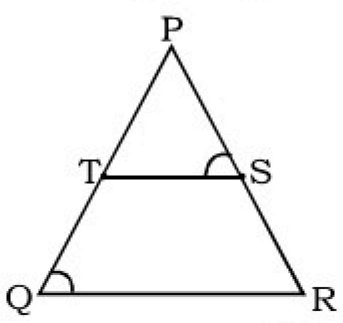
$25 = 9 + 16$

$25 = 25$ (Satified)

$\therefore$ Smallest length of right angle triangle is 3 units

199. (c) According to question

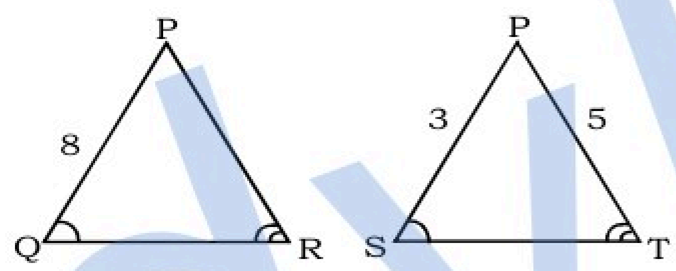
Given:



PT = 5 cm, PS = 3 cm

TQ = 3 cm, SR = ?

$\Delta PQR \sim \Delta PST$



$\frac{PR}{PT} = \frac{PQ}{PS}$ $\frac{PR}{5} = \frac{8}{3}$

$PR = \frac{40}{3}$

$\therefore$ SR = PR – PS

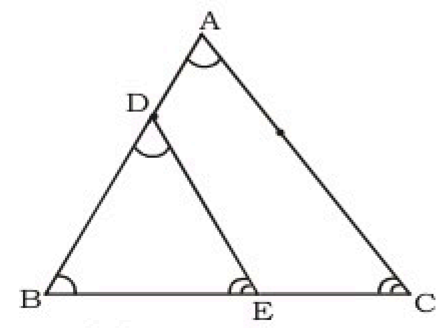
$SR = \frac{40}{3} - 3$

$SR = \frac{40 - 9}{3}$, $SR = \frac{31}{3}$ cm

200. (c) According to question

Given:

'D' and 'E' are the points on AB and BC



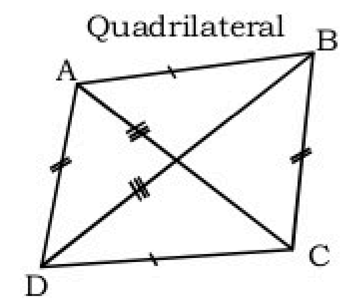
AC | | DE

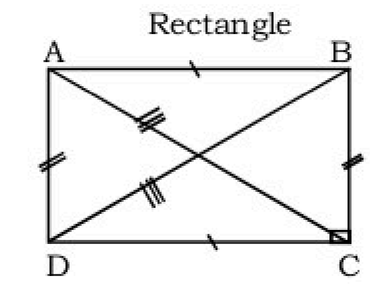
$\angle D = \angle A$

$\angle E = \angle C$

$\therefore$ $\Delta BDE \sim \Delta BAC$

201. (a) According to question





AB = CD	AB = CD
BC = AD	AD = BC
AC = BD	AC = BD

$\angle DCB = 90°$

Note: Only rectangle follows these condition

$\therefore$ angles of the quadrilateral is salme as each angle of rectangle = 90°

202. (d) As we know that

No. of sides = $\frac{360°}{\text{External angle}}$

No. of sides (I-30°)= $\frac{360°}{30°} = 12$

No. of sides (II-36°)= $\frac{360°}{36°} = 10$

No. of sides (III-45°)= $\frac{360°}{45°} = 8$

No. of sides (IV-50°)= $\frac{360°}{50°} = \frac{36}{5}$

$\therefore$ 50° cannot be exterior angle

203. (c) According to question sum of interior angles = 5 × sum of exterior angles

As we know that

Exterior angle + Interior angle = 180°

Exterior angle + 5 Exterior angle = 180°

6 Exterior angle = 180°

Exterior angle = 30°

$\therefore$ no. of sides = $\frac{360°}{\text{External angle}}$

$= \frac{360°}{30°} = 12$

204. (c)According to question

Interior angle – Exterior angle = 132°

As we know that

Interior angle + Exterior angle = 180° ....(i)

Interior angle – Exterior angle
$= 132°$ ….(ii)

2 Interior angle = 312°

Interior angle = 156°

Put this value in equation (i) and (ii)

$\therefore$ Exterior angle = 180° – 156° = 24°

$\therefore$ no. of sides = $\dfrac{360°}{\text{External angle}}$

no. of sides = $\dfrac{360°}{24°} = 15$

205. (c) According to question

$\dfrac{\text{External angle}}{\text{Internal angle}} = \dfrac{1}{17}$

As we know that

External angle + Internal angle = 180°

$\therefore$ 18 units = 180°

1 unit = $\dfrac{180°}{18} = 10°$

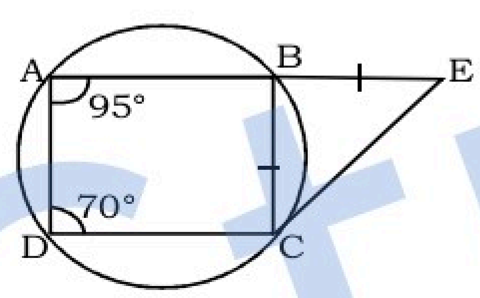
$\therefore$ External angle = 10° × 1 = 10°

$\therefore$ no. of sides = $\dfrac{360°}{\text{External angle}}$

no. of sides = $\dfrac{360°}{10°} = 36$

206. (a) According to question

Given:



BE = BC

$\angle ADC = 70°$, $\angle BAD = 95°$

$\angle DCE = ?$

In cyclic quadrilateral sum of opposite angle is 180°

$\therefore$ $\angle BCD = 180° - 95° = 85°$

$\angle ABC = 180° - 70° = 110°$

$\therefore$ $\angle EBC = 180° - 110° = 70°$

BE = BC

$\therefore$ $\angle BCE = \angle BEC$

In ΔBCE

$\angle BCE + \angle BEC + \angle EBC = 180°$

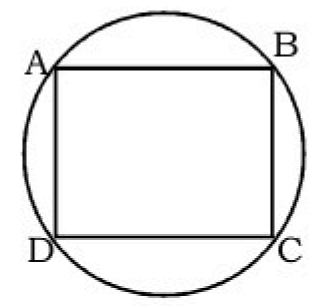
$2\angle BCE = 180° - 70°$

$\angle BCE = 55°$

$\angle DCE = \angle BCE + \angle BCD$

$= 55° + 85° = 140°$

207. (b) According to question



$\angle A = 4x°$ $\angle B = 7x°$

$\angle C = 5y°$ $\angle D = y°$

As we know that in a cyclic quadrilateral sum of opposite angle is 180°

$\angle A + \angle C = 180°$

$4x° + 5y° = 180°$ ……(i)

$\angle B + \angle D = 180°$

$7x° + y° = 180°$ ……. (ii)

From equation (i) and (ii)

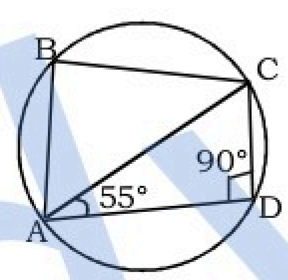
$4x + 5y = 7x + y$

$4y = 3x$

$\dfrac{x}{y} = \dfrac{4}{3}$

208. (b) According to question

Given:



$\angle DAC = 55°$

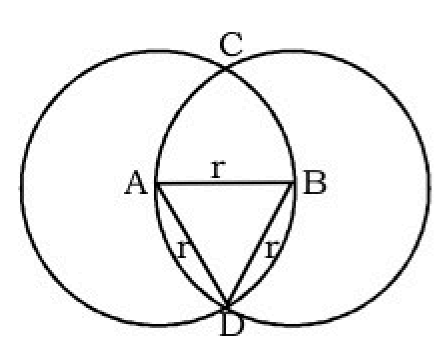
$\angle ADC = 90°$ [Semi-circle]

In ΔCAD

$\angle DAC + \angle DCA + \angle CDA = 180°$

$\angle ACD = 180° - 90° - 55° = 35°$

209. (c) According to question



AB = AD = DB = r

$\therefore$ ΔADB is a equilateral triangle

$\angle DBA = 60°$

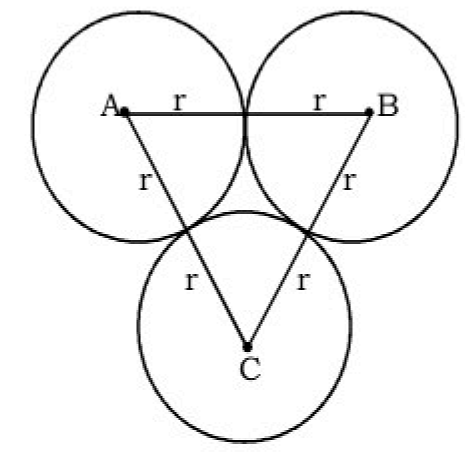
Similar In Δ ABC

$\angle ABC = 60°$

$\angle DBC = 60° + 60°$

$\therefore$ $\angle DBC = 120°$

210. (b)According to the question



Let radius of the circle be = r

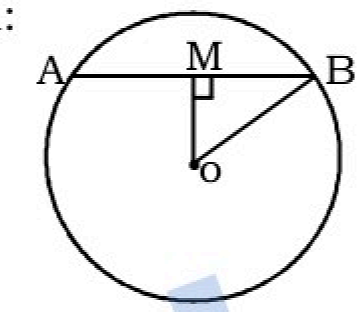
$\therefore$ AB = 2r, BC = 2r, CA = 2r

All these sides are equal

$\therefore$ Triangle ABC is an equilateral Δ

211. (b) According to the question

Given:



AB = 20 cm AM = MB = 10 cm

OM = $2\sqrt{11}$ cm

$OM \perp AB$

OB = radius

$\therefore$ In right angle ΔOMB

By using pythagoras theorem

$OB^2 = OM^2 + MB^2$

$OB^2 = \left(2\sqrt{11}\right)^2 + (10)^2$

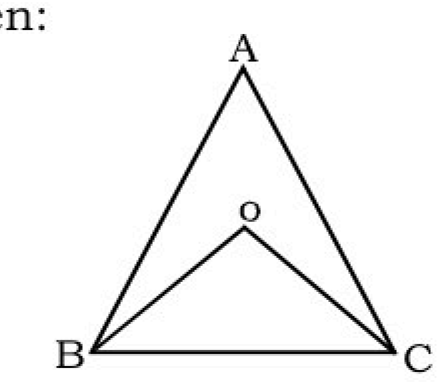
$OB^2 = 44 + 100$

$OB^2 = 144$

OB = 12 cm

212. (d) According to question

Given:



$\angle C = 40°$, $\angle B = 70°$

$\therefore$ In ΔABC

$\angle A + \angle B + \angle C = 180°$

$\angle A = 180° - 40° - 70°$

$\angle A = 70°$

As we know that

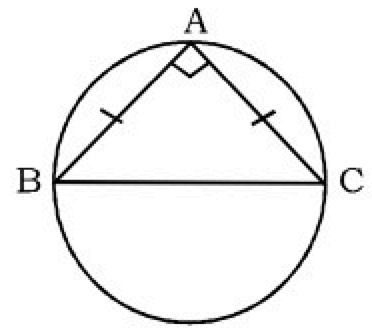
$\therefore$ $\angle BOC = 2\angle A$

(O is a circumcentre)

$\angle BOC = 2 \times 70° = 140°$

213. (b) According to question

Given:



$\angle BAC = 90°$ AB = AC = $5\sqrt{2}$ cm

In right angle ΔBAC

By using Pythagoras theorem

$BC^2 = AB^2 + AC^2$

$BC^2 = \left(5\sqrt{2}\right)^2 + \left(5\sqrt{2}\right)^2$

$BC^2 = 50 + 50$

$BC^2 = 100$

BC = 10 cm

$\therefore$ radius = $\frac{BC}{2}$

radius = $\frac{10}{2}$ = 5 cm

214. (d) According to the figure.

OM = OY = ON

$\therefore$ In ΔOMY

$\angle OMY = \angle OYM = 15°$

$\therefore$ $\angle MOY = 180° - 15° - 15°$

$\angle MOY = 150°$

In ΔONY

$\angle ONY = \angle OYN = 50°$

$\therefore$ $\angle NOY = 180° - 50° - 50°$

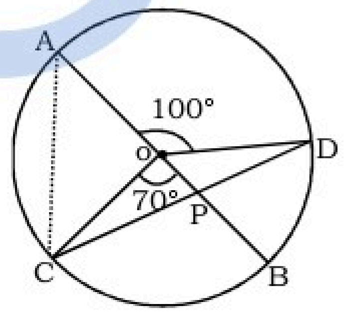
$\angle NOY = 80°$

$\therefore$ $\angle MON = 150° - 80°$

$\angle MON = 70°$

215. (d) According to question

Given :



$\angle AOD = 100°$, $\angle BOC = 70°$

$\therefore$ $\angle ACD = \angle ACP = \frac{100°}{2°} = 50°$

$\therefore$ The angle subtended at the centre is twice to that of angle subtented at the circumferance by the same arc

$\angle BOC = 70°$

$\therefore$ $\angle BDC = \angle BAC = \frac{70°}{2} = 35°$

In Δ APC

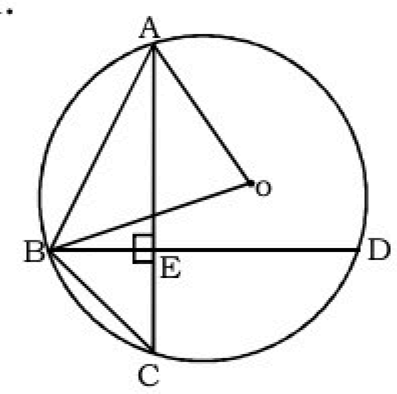
$\angle PAC + \angle ACP + \angle APC = 180°$

$\angle APC = 180° - 50° - 35°$

$\angle APC = 95°$

216. (b)According to question

Given:



$\angle OAB = 25°$ OA = OB = r

$\therefore \angle OAB = \angle OBA = 25°$

$\therefore \angle AOB = 180° - 25° - 25°$

$\angle AOB = 130°$

$\therefore \angle ACB = \frac{1}{2} \angle AOB = \frac{130°}{2} = 65°$

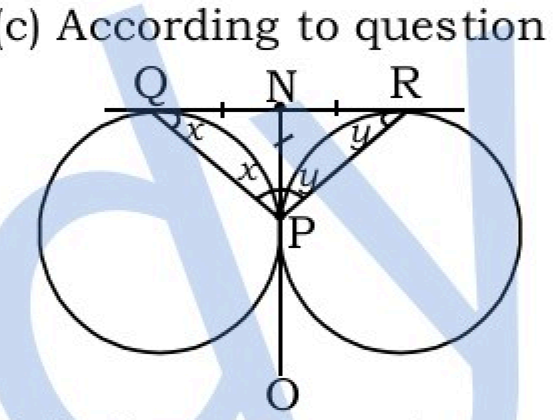
In right angle ΔBEC

$\angle BEC + \angle CBE + \angle ECB = 180°$

$\angle CBE = 180° - 65° - 90°$

$= 25°$

217. (c) According to question



QR is the common tangent and NO is also the common tangent.

$\therefore$ QN = NP = NR

In ΔQPN

$\angle NQP = \angle NPQ$

$\angle NRP = \angle NPR$

In ΔPQR

$\angle P + \angle Q + \angle R = 180°$

$x + y + x + y = 180°$

$2x + 2y = 180°$

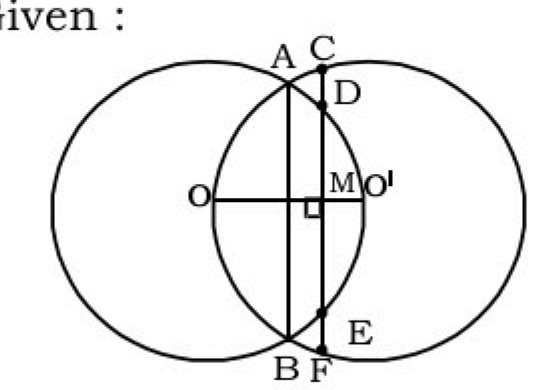
$x + y = 90°$

As shown in the figure

$x + y = \angle P = 90°$

218. (c) According to question

Given :



CD = 4.5 cm

EF = ?

DE is chord in the circle O_1, and CF is chord in the circle O_2

O_1M is $\perp$ on ED that EM = MD .... (i)

O_2M is $\perp$ on CF so that CM = MF .... (ii)

CM = MF

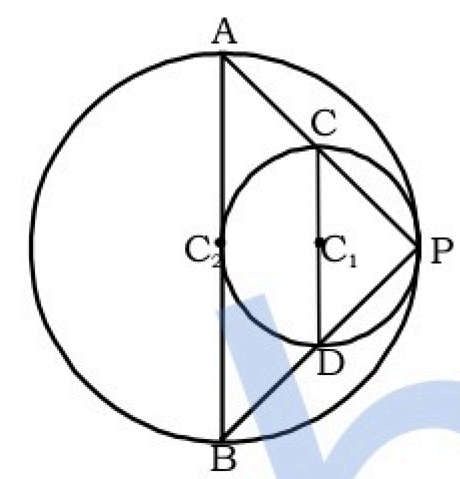
EM + CD = MD + EF

CD = EF = 4.5

EF = 4.5

219. (a) According to question

Given:



$\angle BDC = 120°$ $\angle ABP$ = ?

$\therefore$ $\angle CDP = 180° - \angle BDC$

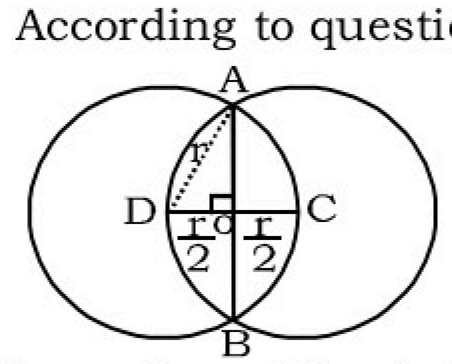
$\angle CDP = 180° - 120°$

$\angle CDP = 60°$

CD || AB

$\therefore$ $\angle CDP = \angle ABP = 60°$

220. (b) According to question



Let the radius of the circle be = r

$\therefore$ DO = OC = $\frac{r}{2}$

In right angle ΔAOD

By using pythagoras theorem

$AD^2 = OD^2 + AO^2$

$r^2 = \frac{r^2}{4} + AO^2$

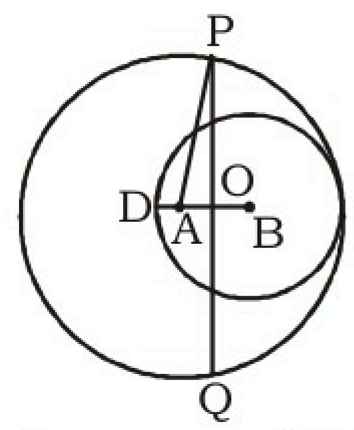
$AO^2 = r^2 - \frac{r^2}{4}$

$AO^2 = \frac{3r^2}{4}$

AO = $\frac{\sqrt{3}r}{2}$ AB = 2 × AO

AB = $\frac{\sqrt{3}}{2}$ r × 2, AB = $\sqrt{3}$**r** units

221. (d) According to question



AP = 5 cm, DB = 3 cm

AB = 5 – 3 = 2 cm

AO = AB ÷ 2 = 1 cm

PQ is $\perp$ bisector

$\therefore$ AO = 1, PO = OQ

In right angle ΔPOA

$AP^2 = OA^2 + OP^2$

$(5)^2 = (1)^2 + (OP)^2$

$(OP)^2 = 25 - 1$

$(OP)^2 = 24$

$(OP) = 2\sqrt{6}$ cm

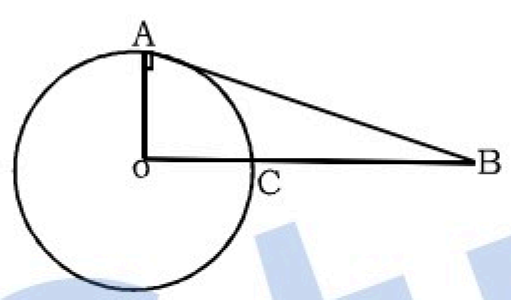
$\therefore$ PQ = 2 × OP

PQ = $2 \times 2\sqrt{6}$

PQ = $4\sqrt{6}$ cm

222. (a) According to question

Given:



OA = radius = 5 units

AB = $5\sqrt{3}$ units

BC = ?

In right angle ΔOAB

$OB^2 = AB^2 + OA^2$

$OB^2 = \left(5\sqrt{3}\right)^2 + (5)^2$

$OB^2 = 75 + 25$

$OB^2 = 100$

OB = 10 units

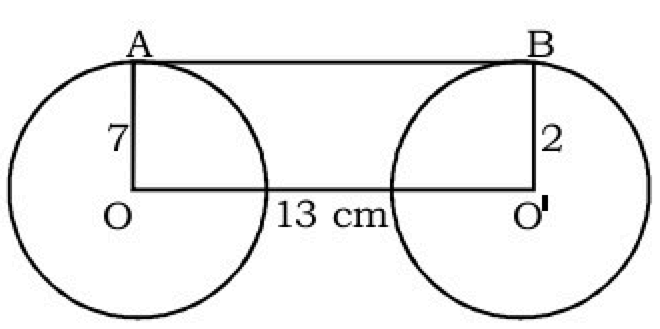
$\therefore$ BC = OB – OC

BC = 10 – 5

BC = 5 units

223. (a) According to question

Given:



OO' = 13 cm, OA = 7 cm

O'B = 2 cm

$\therefore$ Length of direct common tangent

AB = $\sqrt{(OO')^2 - (R - r)^2}$

AB = $\sqrt{(13)^2 - (7 - 2)^2}$

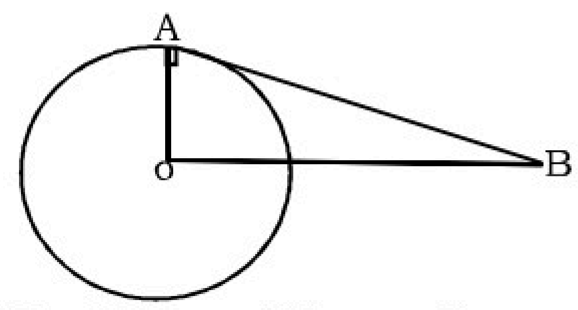
AB = $\sqrt{169 - 25}$

AB = $\sqrt{144}$

AB = 12 cm

224 (d) According to question

Given:



OB =10 cm, OA = radius = 6 cm

AB = tangent

In right angle ΔOAB

By using pythagoras theorem

$OB^2 = OA^2 + AB^2$

$(10)^2 = (6)^2 + (AB)^2$

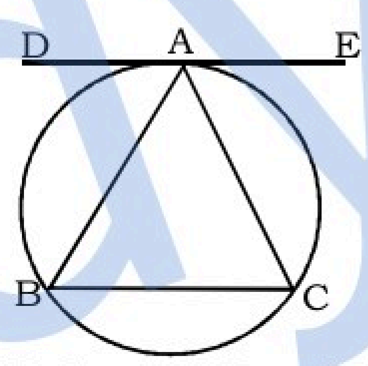
$(AB)^2 = 100 - 36$

$(AB)^2 = 64$

AB = 8

225. (d) According to question

Given:



DE||BC, AB = 17 cm

AC = ?

$\angle DAB = \angle ACB$

(By alternate segment theorem)

$\angle DAB = \angle ABC$

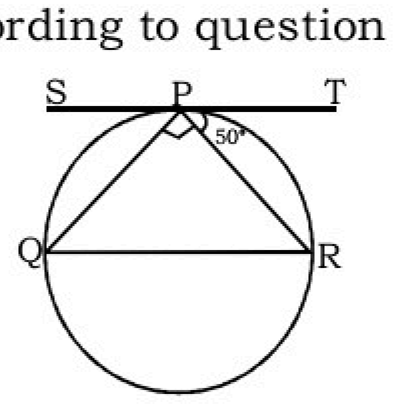
(Alternate angle)

$\therefore \angle ABC = \angle ACB$

AB = AC = 17 cm

226. (a) According to question

Given:



$\angle$RPT = 50°

$\angle$QPR = 90°(Angle in Semicircle)

$\therefore \angle PQR = 50°$

(Alternate segment theorem)

In Δ PQR

$\angle P + \angle Q + \angle R = 180°$

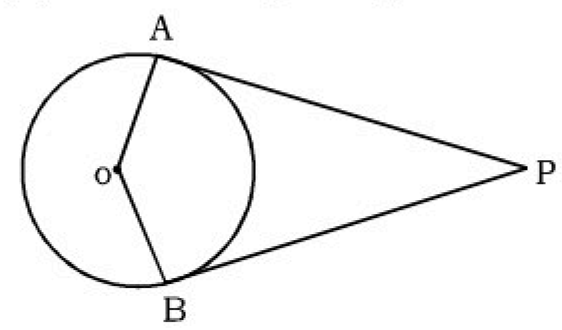
$\angle R = 180° - 90° - 50°$

$\angle R = 40°$

$\therefore \angle SPQ = 40°$

(Alternate segment theorem)

227. (b) According to question



$\angle AOB = 110°$

$\angle APB = ?$

AOBP is a quadrilateral

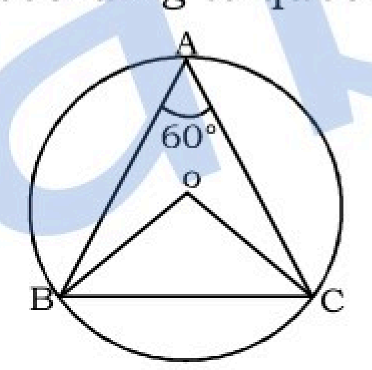
$\angle O + \angle A + \angle P + \angle B = 360°$

$110° + 90° + 90° + \angle P = 360°$

$\angle P = 360° - 290°$

$\angle APB = 70°$

228. (c) According to question



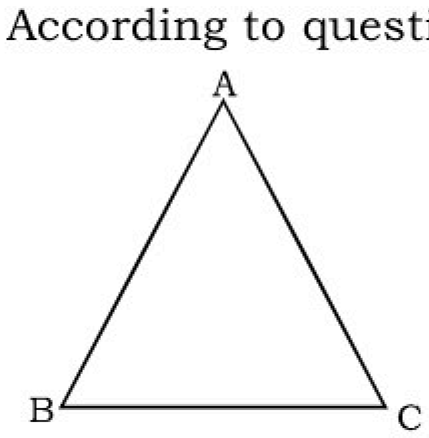
$\angle A = \angle B = \angle C = 60°$

$\angle BOC = 2\angle A$

$\angle BOC = 2 \times 60°$

$\angle BOC = 120°$

229. (d) According to question



$\angle A + \angle B = 118°$

$\angle A + \angle C = 96°$

$\angle A = ?$

As we know that

$\angle A + \angle B + \angle C = 180°$

$\angle C = 180° - (\angle A + \angle B)$

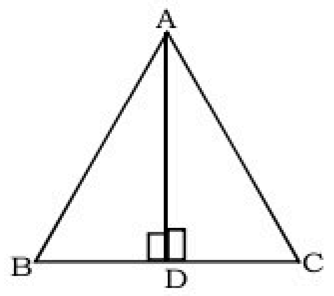
$\angle C = 180° - 118°$

$\therefore \angle C = 62°$

$\angle A = 96° - 62°$, $\angle A = 34°$

230. (b) According to question

Given:



AD $\perp$ BC

$\therefore$ In ΔADB

$AB^2 = BD^2 + AD^2$

$AD^2 = AB^2 - BD^2$ ....(i)

In ΔADC

$AC^2 = AD^2 + CD^2$

$AD^2 = AC^2 - CD^2$..................(ii)

Compare equation (i) and (ii)

$AB^2 - BD^2 = AC^2 - CD^2$

$AB^2 + CD^2 = BD^2 + AC^2$

231. (b) According to question

$\angle A + \frac{1}{2}\angle B + \angle C = 140°$ ...(i)

As we know that

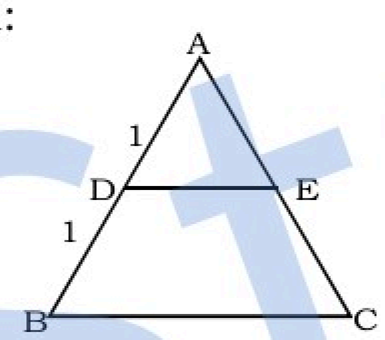
$\angle A + \angle B + \angle C = 180°$ ....(ii)

Compare equation (i) and (ii)

$\frac{1}{2}\angle B = 40°$, $\angle B = 80°$

232. (c) According to question

Given:



AB = 2AD $\frac{AB}{AD} = \frac{2}{1}$

By applying B.P.T

$\frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$

$\frac{DE}{BC} = \frac{1}{2}$

233. (a) According to question

Given:

$2\angle A = 3\angle B$

$\frac{\angle A}{\angle B} = \frac{3}{2}$ $3\angle B = 6\angle C$

$\frac{\angle B}{\angle C} = \frac{6}{3} = \frac{2}{1}$

To make angle $\angle B$ same

$\therefore$ $\angle A : \angle B : \angle C$

3 : 2 : 1

As we know that

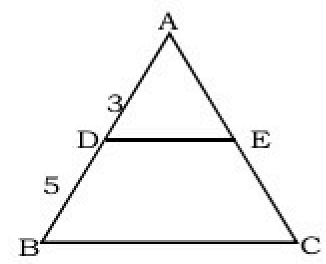
$\angle A + \angle B + \angle C = 180°$

$3x + 2x + x = 180°$

$x = 30°$

$\angle B = 2x = 60°$

234. (a) According to question



Given: AD = 3, BD = 5

AB = 8, AC = 4

AE = ?

By applying B.P.T

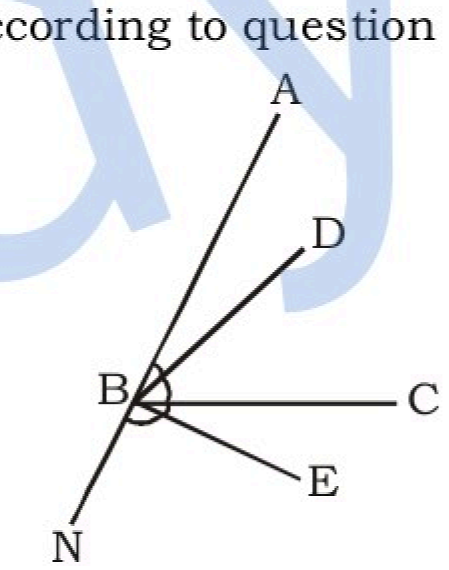
$\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$

$\frac{3}{8} = \frac{AE}{4}$

$AE = \frac{3}{2} = 1.5$ cm

235 (d) According to question

Given:



BD is an internal bisector of $\angle$B,

BE is external bisector of $\angle B$

Let $\angle ABC = x$

$\angle CBN = 180 - x$

$\angle DBC = \frac{x}{2}$

$\angle EBC = \frac{1}{2}(180° - x)$

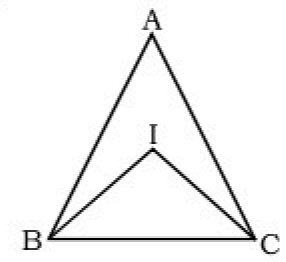
$\angle EBC = 90° - \frac{x}{2}$

$\therefore$ $\angle DBE = 90° - \frac{x}{2} + \frac{x}{2}$

$\angle DBE = 90°$

236. (c) According to question

Given:



$\angle BIC = \frac{\angle A}{2} + X$ ......(i)

As we know that

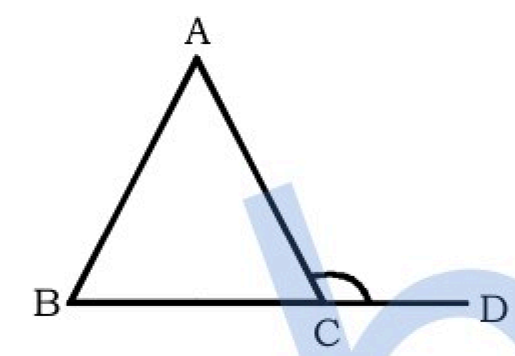
$\angle BIC = 90° + \frac{\angle A}{2}$ ....(ii)

Compare equation (i) and (ii)

X = 90°

237. (b) According to question

Given:



$\angle ACD = 120°$

$\frac{\angle ABC}{\angle CAB} = \frac{1}{2}$ units

$\therefore \angle ACB = 180° - 120°$

$\angle ACB = 60°$

As we know that

$\angle A + \angle B + \angle C = 180°$

$\angle A + \angle B = 180° - 60°$

$\angle A + \angle B = 120°$

3 units = 120°

1 unit = 40°

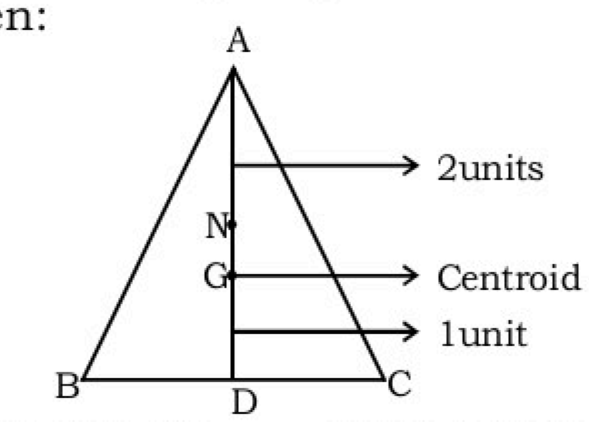
$\angle ABC = 1 \times 40° = 40°$

$\angle CAB = 2 \times 40° = 80°$

$\therefore \angle ABC = 40°$

238. (a)According to question

Given:



AD = 27 cm, DN = 12 cm

As we know that

AG = 2 units, GD = 1 unit

$\therefore$AD = 3 units = 27 cm

3 units = 27 cm

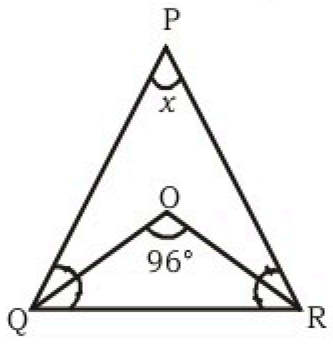
1 unit = 9 cm

$\therefore$GD = 9 cm

$\therefore$ GN = DN – GD = 12 – 9 = 3 cm

239. (a) Value of

$$\angle ROQ = 90 + \frac{\angle P}{2}$$



$\Rightarrow$ $96 = 90 + \frac{\angle P}{2}$

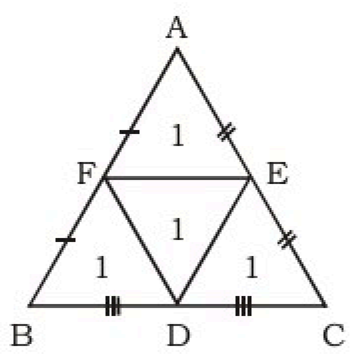
$\Rightarrow$ $6 = \frac{\angle P}{2}$

$\Rightarrow$ $\angle P = 12°$

Therefore $\angle RPQ = 12°$

240. (d) We know when a new triangle is formed by using mid points of big triangle.

$\Rightarrow$ In this case Area of 4 triangle is same



$\Rightarrow$ i.e. Area of Δ AFE = Δ FBD = Δ FDE = Δ DEC = 1

$\Rightarrow$ Parallelogram DEFB = Δ BFD + Δ DFE = 1 + 1

$\Rightarrow$ Area of Parallelogram DEFB = 2 ....(i)

$\Rightarrow$ Again trapezium CAFD

= Δ AFE + Δ FED + Δ DCE = 1 + 1 + 1

Area of Trapezuim CAFD = 3 ....(ii)

Required Ratio will be = 2 : 3

241. (b) According to question,

$$\Rightarrow (x + 15°) + \left(\frac{6x}{5} + 6\right)^0 + \left(\frac{2x}{3} + 30\right)^0 = 180°$$

$\{\angle A + \angle B + \angle C = 180°$

$$\Rightarrow x + \frac{6x}{5} + \frac{2x}{3} = 180° - (15 + 6 + 30)$$

$$\Rightarrow \frac{15x + 18x + 10x}{15} = 180 - 51$$

$\Rightarrow$ $43x = 129 \times 15$

$\Rightarrow$ $x = 45°$

$\Rightarrow$ each angle

$\Rightarrow$ $(x + 15)° = 45 + 15 = 60°$

$$\Rightarrow \left(\frac{6x}{5} + 6\right)^o = 60°$$

$$\Rightarrow \left(\frac{2x}{3} + 30\right)^o = 60°$$

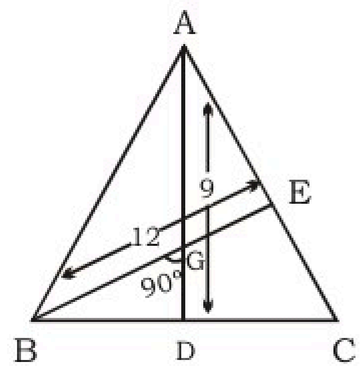
$\because$ All three angles are equal 60°

$\Rightarrow$ Triangle will be equilateral triangle

242. (b)Medians AD and BE intersect at G on 90°

i.e $\angle AGB = 90°$ and ΔAGB will be a right angled triangle

We know, In a triangle centroid divides the medians in 2 : 1 Ratio



$\Rightarrow$ Then $BG = \frac{2}{3} \times BE$

$BG = \frac{2}{3} \times 12$

$BG = 8$

$\Rightarrow$ $AG = \frac{2}{3} \times AD$

$\Rightarrow$ $AG = \frac{2}{3} \times 9$

$\Rightarrow$ AG = 6 cm

In right angled triangle AB will be a hypotenuse

using pythagoras theorem

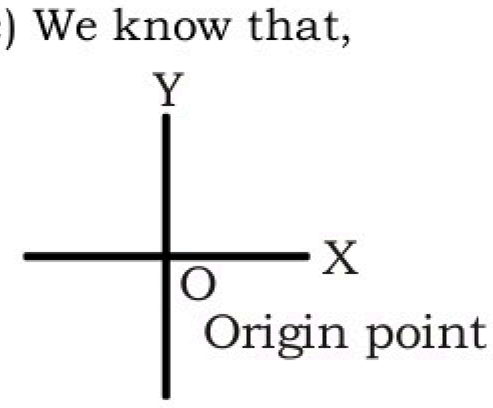
$\Rightarrow$ $(AB)^2 = (AG)^2 + (BG)^2$

$\Rightarrow$ $(AB)^2 = 6^2 + 8^2$

$\Rightarrow$ AB = 10 cm

Therefore, length of AB = 10 cm.

243. (c) We know that,



A straight line that passes through origin, has distance from origin point 'O' is zero

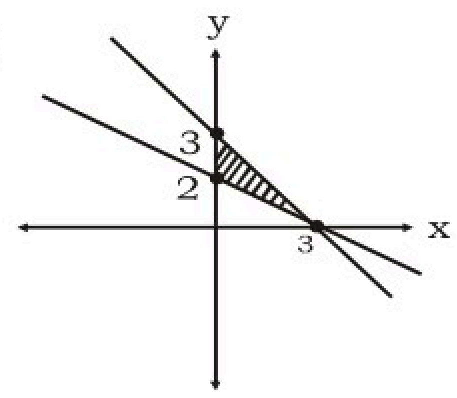
i.e in this straight line equation C = 0,

All the equations given in the question only equation $2x - 3y = 0$ has C = 0

$[\text{because } ax + by + c = 0]$

So, this equation will be = $2x - 3y = 0$

244. (d)



x = 0

2x + 3y = 6

x	0	3
y	2	0

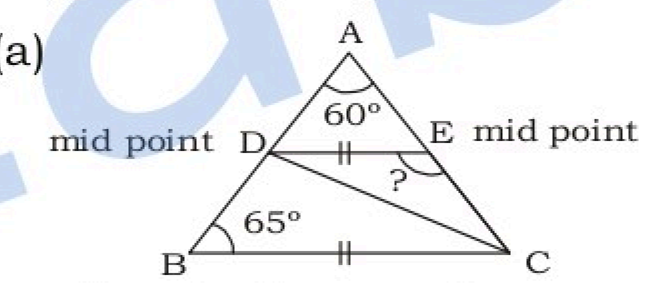
x + y = 3

x	0	3
y	3	0

required area

$$= \frac{1}{2} \times 3 \times 1 = \frac{3}{2} = 1\frac{1}{2} \text{ squ. unit}$$

245. (a)



According to the question,

$\Rightarrow$ D and E are the mid point of side AB and AC respectively

$\Rightarrow$ So, DE||BC

[from thales theorem]

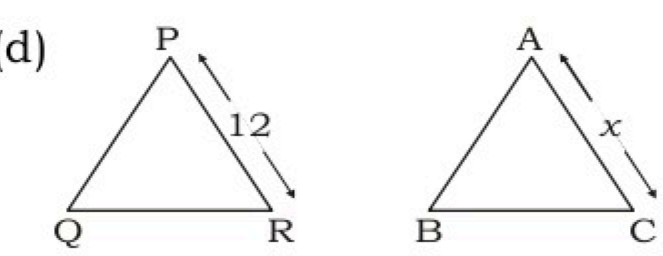
$\Rightarrow$ So, $\angle ABC = \angle ADE = 65°$

$\Rightarrow$ $\angle CED = \angle ADE + \angle DAE$

[External angle theorem in Δ ADE]

$\Rightarrow$ $\angle CED = 60° + 65° = 125°$

246. (d)



$\because$ $\Delta PQR \sim \Delta ABC$

$\Rightarrow$ We know that in similar triangle

$$\Rightarrow \frac{\text{Area of triangle}_1}{\text{Area of triangle}_2} = \frac{(\text{Corresponding side}_1)^2}{(\text{Corresponding side}_2)^2}$$

$$\Rightarrow \frac{\Delta PQR}{\Delta ABC} = \frac{256}{441}$$

$$\Rightarrow \frac{\Delta PQR}{\Delta ABC} = \frac{(PR)^2}{(AC)^2}$$

$$\Rightarrow \frac{256}{441} = \frac{(12)^2}{(AC)^2}$$

$$\Rightarrow \left(\frac{16}{21}\right)^2 = \left(\frac{12}{AC}\right)^2$$

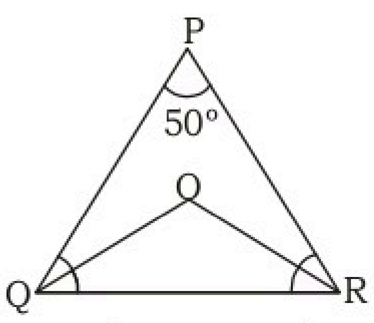
$$\Rightarrow \frac{16}{21} = \frac{12}{AC}$$

$$\Rightarrow \frac{4}{21} = \frac{3}{AC}$$

$$\Rightarrow AC = \frac{63}{4}$$

$\Rightarrow$ AC = 15.75 cm.

247. (d)



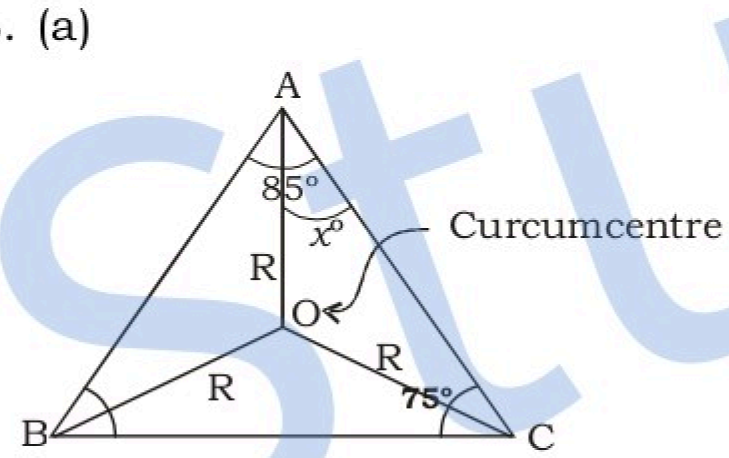
According to the question,

$$\Rightarrow \angle QOR = 90° + \frac{\angle A}{2}$$

$$\Rightarrow \angle QOR = 90° + \frac{50°}{2}$$

$\Rightarrow$ $\angle QOR = 90° + 25° = 115°$

248. (a)



$\because$ O is circumcentre

So, OA = OB = OC = R (Radius)

$\because$ $\angle BAC = 85°$, $\angle BCA = 75°$

Then,

[$\angle ABC = 180° - (\angle BAC + \angle BCA)$]

$\angle ABC = 180° - (85° + 75°)$

$\Rightarrow \angle ABC = 180° - 160°$

$\Rightarrow \angle ABC = 20°$

[*Angle made by same chord at the centre is doubled than that of any other part of the curcumference at same sector*]

Then, $\angle AOC = 20° \times 2 = 40°$

$\because$ OA = OC = R

So, ΔAOC = Isosceles triangle

Then,

$\angle OCA + \angle OAC + \angle AOC = 180°$

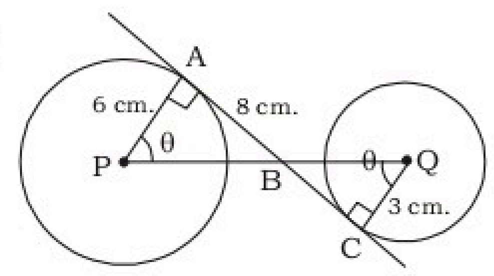
$x + x + \angle AOC = 180°$

$2x + 40° = 180°$

$x = 70°$

Therefore, $\angle OAC = 70°$

249. (b)



According to the question,

$\Rightarrow$ AP = 6 cm (Radius$_1$)

$\Rightarrow$ QC = 3 cm (Radius$_2$)

As we know, any line drawn from centre to the tangent is perpendicular

$\Rightarrow$ So, $\angle PAB = \angle QCB = 90°$

$\Rightarrow$ $\angle APB = \angle CQB = \theta$

[same alternative angle]

$\Rightarrow$ So, $\Delta APB \sim \Delta CQB$

$$\Rightarrow \frac{AP}{CQ} = \frac{AB}{CB}$$

$$\Rightarrow \frac{6}{3} = \frac{8}{CB}$$

$\Rightarrow$ CB = 4 cm.

$\Rightarrow$ In right angled triangle ΔPAB

$\Rightarrow$ $(PB)^2 = (PA)^2 + (AB)^2$

$\Rightarrow$ $(PB)^2 = 6^2 + 8^2$

$\Rightarrow$ PB = 10 cm.

$\Rightarrow$ Again, in right angled triangle ΔCQB

$\Rightarrow$ $BQ^2 = (BC)^2 + (CQ)^2$

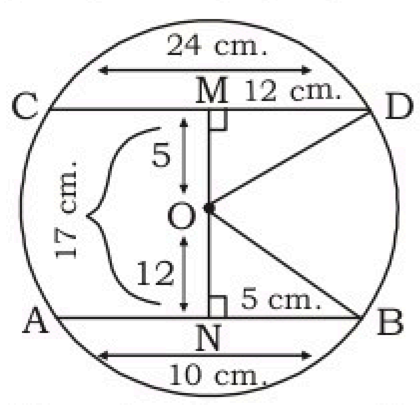
$\Rightarrow$ $(BQ)^2 = 3^2 + 4^2$

$\Rightarrow$ BQ = 5 cm.

$\Rightarrow$ Therefore PQ = PB + BQ

$\Rightarrow$ 10 + 5 = 15 cm.

250. (a)



According to the question,

$\because$ ΔOMD and ΔONB are right angled triangle

And, OD = OB = R

In ΔOMD, from triplets

5, 12, 13

OM = 5 cm, OD = 13 cm,

MD = 12 cm.

Again, In ΔONB, from triplets

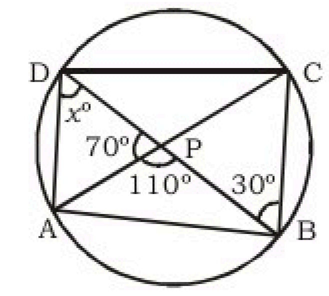
5, 12, 13

OB = 13 cm, ON = 12 cm

$\because$ OB = OD = 13 cm

Radius = 13 cm.

251. (d)



According to the question,

$\angle APB = 110°$

$\angle PBC = 30°$

Let $\angle ADB = x°$

By chord CD

$\angle CBD = \angle CAD = 30°$

$\angle APD = 180° - 110°$

$\angle APD = 70°$

In ΔAPD,

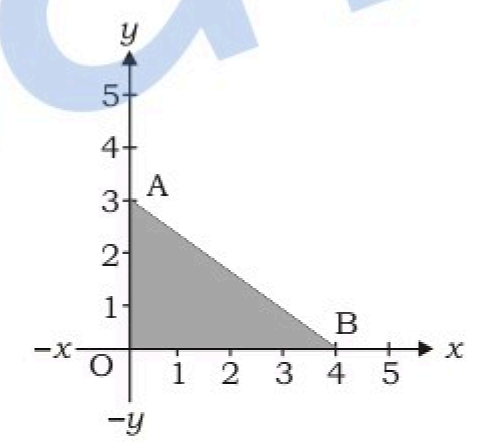
$\angle ADP + \angle PAD + \angle APD = 180°$

$\angle x + 30° + 70° = 180°$

$x° = 180° - 100$

$x° = 80°$

252. (a)



According to the question,

$\Rightarrow$ At X – Axis

OB = 4 units

$\Rightarrow$ At Y – Axis

OA = 3 units

$\Rightarrow$ From equation,

$3x + 4y = 12$

$3\times0 + 4y = 12$ [At Y-axis, X = 0]

y = 3 units

$\Rightarrow$ Again, $3x + 4\times0 = 12$

[At X-axis, Y = 0]

x = 4 units

$\Rightarrow$ Area of triangle OAB

$$= \frac{1}{2} \times OA \times OB = \frac{1}{2} \times 3 \times 4$$

= 6 sq. units

253. (c) Hour hand makes $\left(\frac{1}{2}\right)^{\circ}$ angle in one minute

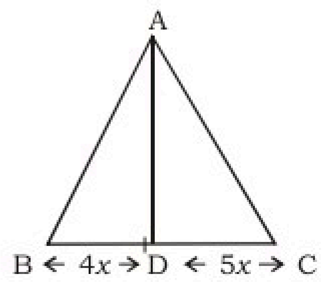
$\Rightarrow$ 3 hours 45 minutes = 225 minutes

$\Rightarrow$ 1 minute .... $\left(\frac{1}{2}\right)^{\circ}$

$\Rightarrow$ 225 minutes

$\therefore \left(\frac{1}{2} \times 225\right)^{\circ} = 112\frac{1}{2}^{\circ}$

254. (c) $\because$ Height will be same for both triangles



In triangles ADB If Base = $4x$ and Area = 60 cm²

Area of Δ ADB = 60 cm²

$\frac{1}{2} \times$ base $\times$ height = 60

$\Rightarrow \frac{1}{2} \times 4x \times$ height = 60

$\Rightarrow$ height = $\frac{60}{2x}$

$\Rightarrow$ height = $\frac{30}{x}$ cm.

$\Rightarrow$ Therefore using height Area of Δ ADC will be

$= \frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times 5x \times \frac{30}{x}$

= 75 cm²

255. (b) Let the angle be θ°

According to question

$\Rightarrow$ $180^{\circ} - \theta^{\circ} = 3(90^{\circ} - \theta^{\circ})$

$\Rightarrow$ $180^{\circ} - \theta^{\circ} = 270^{\circ} - 3\theta$

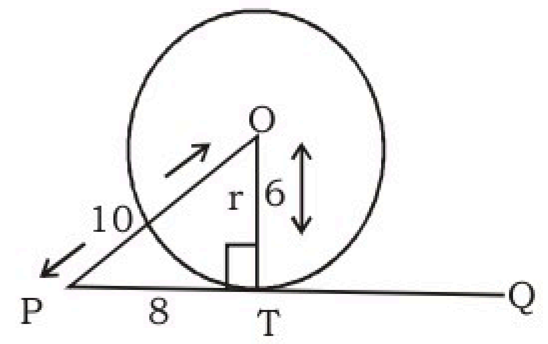
$\Rightarrow$ $2\theta = 90^{\circ}$

$\Rightarrow$ $\theta = 45^{\circ}$

Note : supplement angle = $180^{\circ} - \theta$ = $180^{\circ} - 45 = 135^{\circ}$

Complement angle = $90 - \theta$ = $90^{\circ} - 45^{\circ} = 45^{\circ}$

256. (c)



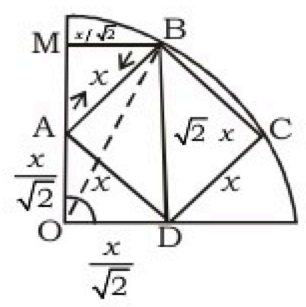
Let PTQ is the Tangent of circle having centre O and Radius = r and point T, touches the circle

$\Rightarrow$ We know that any line draw on tangent's touching point from centre, always makes a perpendicular

So $\angle$ OTP = 90° length of PT = 8 cm

$\left\{ \begin{matrix} 3, & 4, & 5 \\ 2\times\downarrow & \times\downarrow 2 & \downarrow\times 2 \\ 6 & 8 & 10 \end{matrix} \right\}$

257. (c) Let ABCD is a square of x unit side



Then $\angle$ AOD = 90°

then OD = $\frac{x}{\sqrt{2}}$

diagonal of square ABCD = $\sqrt{2}\,x$

Line MB || OD

i.e OD = MB = $\frac{x}{\sqrt{2}}$

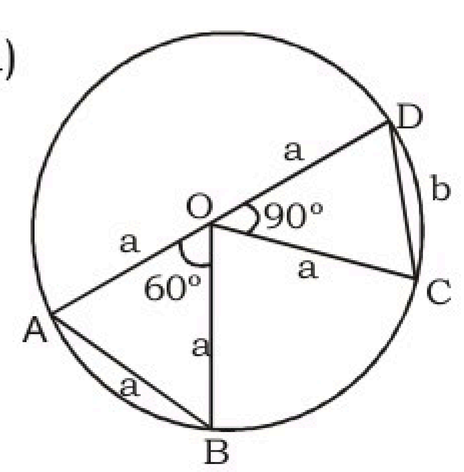
$\Rightarrow$ then MB OD will be a Rectangle become

MB || OD, MB = OD = $x/\sqrt{2}$

BD || MO, MO = BD = $\sqrt{2}\,x$

$R = \sqrt{\left(\frac{x}{\sqrt{2}}\right)^2 + \left(\sqrt{2}\,x\right)^2} = \frac{\sqrt{5}x}{\sqrt{2}}$ Ans.

258. (a)



$\angle$ AOB = 60°

$\angle$ COD = 90°

$\Rightarrow$ length of chord AB = a

$\Rightarrow$ length of chord CD = b

$\Rightarrow$ AO = OB = AB = OD = OC = a

$\Rightarrow$ In ΔODC

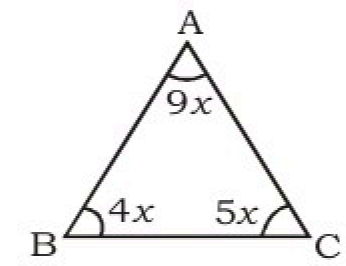
$\Rightarrow$ $OD^2 + OC^2 = CD^2$

$\Rightarrow$ $a^2 + a^2 = b^2$

$\Rightarrow$ $b = \sqrt{2}a$

259. (d) Let the ratio of angle be = x

$\Rightarrow$ According to the question,



$\Rightarrow$ $\angle B = 4x$, $\angle C = 5x$

$\Rightarrow$ $\angle A = (\angle B + \angle C)$

$\Rightarrow$ $\angle A = 4x + 5x$

$\Rightarrow$ $\angle A = 9x$

$\Rightarrow$ We know that

$\Rightarrow$ $\angle A + \angle B + \angle C = 180^{\circ}$

$\Rightarrow$ $4x + 5x + 9x = 180$

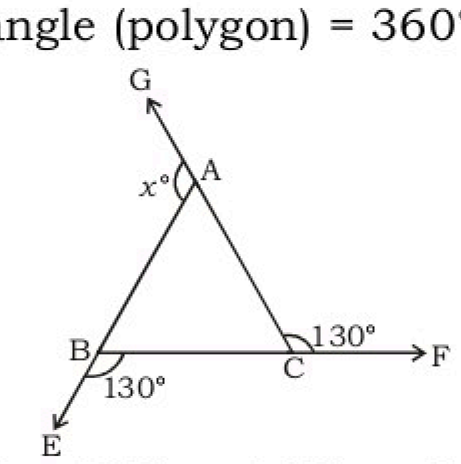
$\Rightarrow$ $18x = 180$

$\Rightarrow$ $x = 10^{\circ}$

$\Rightarrow$ Therefore smallest angle be $4x$ = 4 × 10 = 40°

260. (a) We know that

$\Rightarrow$ Add of total exterior angle of a triangle (polygon) = 360°



$\Rightarrow$ So, $130^{\circ} + 130^{\circ} + x^{\circ} = 360$

$x = 100^{\circ}$

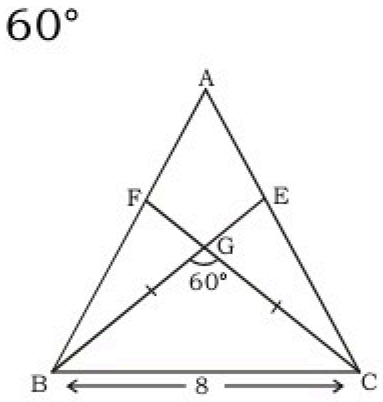
261.(b) According to the question,

$\Rightarrow$ $\because \angle BGC = 60^{\circ}$ (Given)

$\Rightarrow$ $\angle GBC = \angle GCB = x^{\circ}$

$\Rightarrow$ $x^{\circ} + x^{\circ} + 60^{\circ} = 180^{\circ}$

$\Rightarrow$ $x = 60^{\circ}$



$\Rightarrow$ So Δ BGC is an equilateral triangle with side 8cm each

Then

Area of triangle Δ BGC

$= \frac{\sqrt{3}}{4}a^2 = \frac{\sqrt{3}}{4}8^2$

$= 16\sqrt{3}cm^2$

$\Rightarrow$ Area of ΔABC

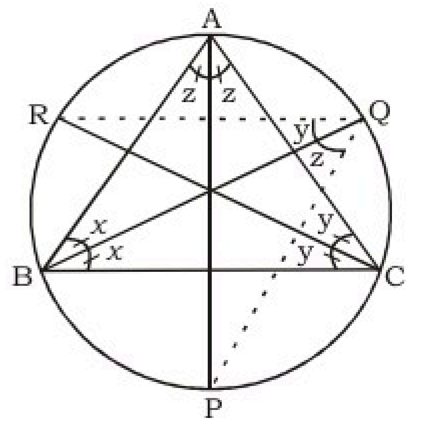
= Area (ΔBGC + ΔAGC + ΔAGB)

$\Rightarrow$ Area of ΔABC $= 3 \times 16\sqrt{3}$

$= 48\sqrt{3}$ cm^2

$\left\{\because \Delta BGC = \Delta AGC = \Delta AGB\right\}$

262. (a)



From chord BP

$\angle$BAP = $\angle$BQP = z (Angle substended by same chord on circumference)

similarly from chord RB

$\angle$RCB = $\angle$RQB = y

In Δ ABC

$2x + 2y + 2z = 180°$

$x + y + z = 90°$

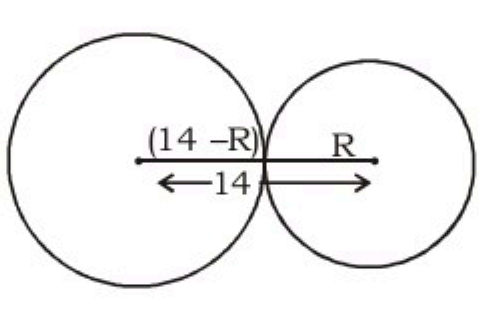
$y + z = 90° - x$

$\angle RQP = 90° - x$

$\angle RQP = 90° - \frac{\angle B}{2}$

263. (b) Let smallest circle radius = R

Then biggest circle radius = (14 – R)



$\Rightarrow$ According to the question,

$\Rightarrow \pi(14 - R)^2 + \pi R^2 = 130\pi$

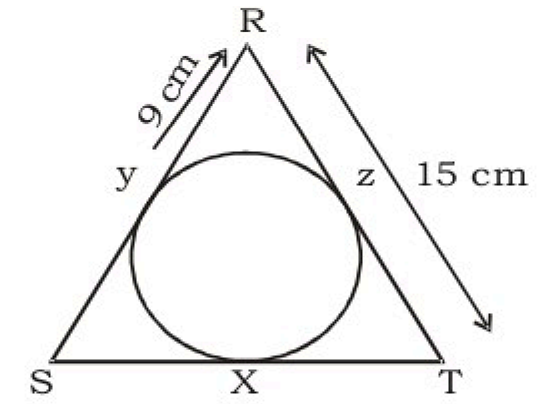
$\Rightarrow (14 - R)^2 + R^2 = 130$

$\Rightarrow 196 + R^2 - 28R + R^2 = 130$

$\Rightarrow$ R = 3 cm

$\Rightarrow$ Radius of smallest circle R = 3 cm

264. (d)



xy = 9 cm, Tx = 15 cm

$\Rightarrow$ We know

Length of tangents drawn from a point to the circle are equal

Therefore

XY = XZ = 9CM, TZ = RT

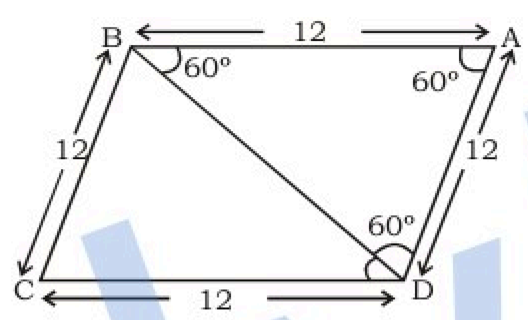
TX = 15 CM

XZ + ZT = 15

ZT = 15 – 9 = 6

RT = ZT = 6 CM

265. (c) We know that in a Rhombus diagonal bisect the angle.



$\because \angle A = 60°$

then $\angle B = 180° - 60°$

$\angle ABC = 120°$

Now $\angle ABD = \angle CBD = \frac{120}{2} = 60°$

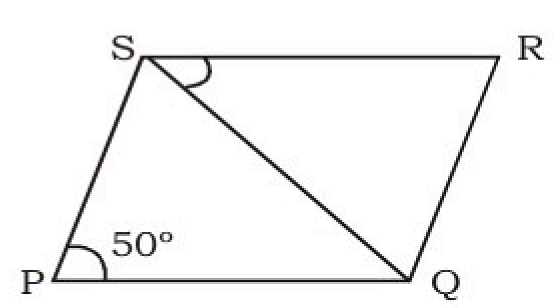
$\Rightarrow$ So $\angle ABD = \angle BDA = \angle BAD = 60°$

$\Rightarrow$ So ΔABD is an equilateral triangle

then AD = AB = BD = 12 cm

$\Rightarrow$ So Diagonal BD = 12 cm

266. (d) According to the previous question,

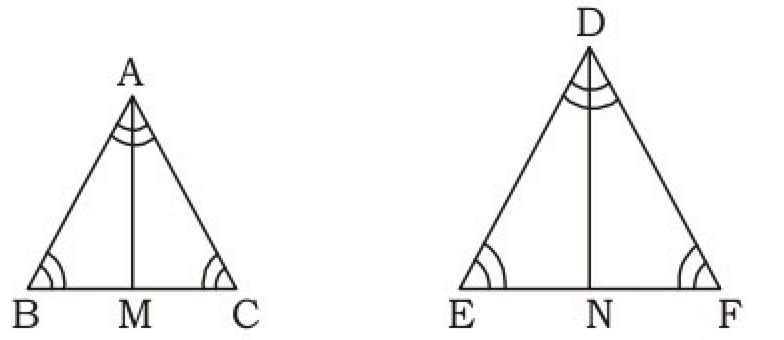


$\angle P = 50°$, $\angle R = 50°$

then $\angle PSR = 180° - 50° = 130°$

then $\angle RSQ = \frac{130°}{2} = 65°$

267. (b)



If two isosceles triangles have equal vertical angles then both triangles are similar.

So, $\Delta ABC \sim \Delta DEF$

We know,

In similarity case

$\Rightarrow \frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF}$

$= \frac{(AB)^2}{(DE)^2}$ corresponding sides square

$= \frac{(AM)^2}{(DN)^2}$ height

$\Rightarrow \frac{9}{16} = \frac{(AM)^2}{(DN)^2}$

$= \sqrt{\frac{9}{16}}$ = Ratio of their height

$\Rightarrow$ Ratio of height = 3:4

268. (b) Let ΔABC and ΔPQR are two similar triangle

$\Rightarrow$ Perimeter of ΔABC = 20 cm.

$\Rightarrow$ Perimeter of ΔPQR = 30 cm.

$\Rightarrow$ QR = 9 cm, BC = ?

$\Rightarrow$ In the similarity case

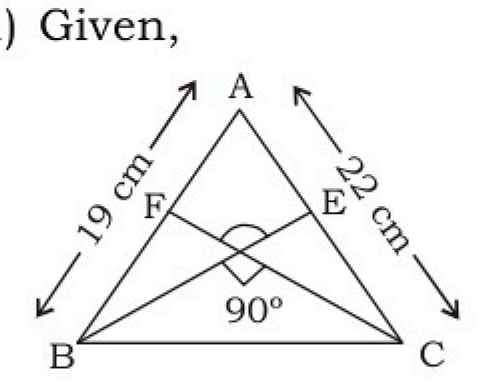
$\Rightarrow \frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR}$

$= \frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$

[Ratio of their corre. sides]

$\Rightarrow \frac{20}{30} = \frac{BC}{9} \Rightarrow$ BC = 6 cm

269. (d) Given,



AB = 19 cm, AC = 22 cm,

$\because$ BE $\perp$ CF (Given), [Medians CF & BE are perpendicular to each other]

$\Rightarrow$ In this case

$\Rightarrow$ We know,

$AB^2 + AC^2 = 5(BC)^2$

$\Rightarrow 19^2 + (22)^2 = 5(BC)^2$

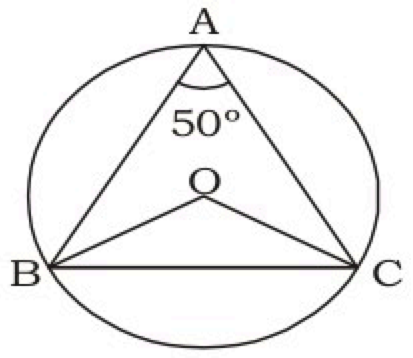
$\Rightarrow 361 + 484 = 5(BC)^2$

$\Rightarrow 845 = 5(BC)^2$

$\Rightarrow (BC)^2 = 169$

$\Rightarrow$ BC = 13 cm

270.(c)



$\because \angle BAC = 50^\circ$ (Given),

Then, we know,

$\Rightarrow \angle BOC = 50^\circ \times 2$ (with chord BC)

$\Rightarrow \angle BOC = 100^\circ$

$\Rightarrow$ OB = OC = r

Then $\angle OBC = \angle OCB = x^\circ$

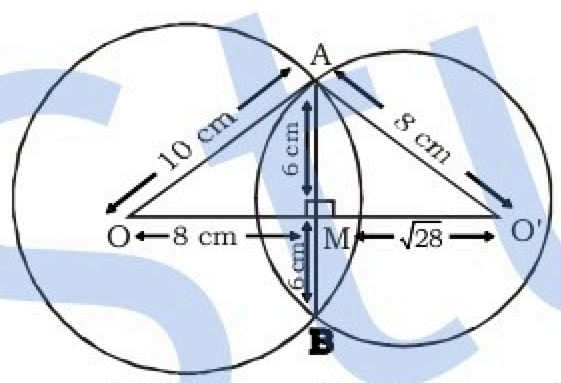
$\Rightarrow \angle OBC + \angle OCB + \angle BOC = 180^\circ$

$\Rightarrow x^\circ + x^\circ + 100 = 180^\circ$

$\Rightarrow x = 40^\circ$

$\Rightarrow$ Therefore $\angle OBC = 40^\circ$

271. (a)



Note: $\because \Delta AMO$ = Right angled triangle = $\Delta AMO'$

In, ΔAMO

$\Rightarrow$ AM = 6, AO = 10

then, OM = 8

In, $\Delta AMO'$

$\Rightarrow$ AM = 6, AO' = 8

then, O'M = $\sqrt{28}$

$\Rightarrow$ O O' = OM + O'M

$= 8 + \sqrt{28}$

$\Rightarrow$ 13.3 cm

272. (a) Let ABCD is quadrilateral and its BD diagonal

BD = 24 metres

And, AM = 8 metres

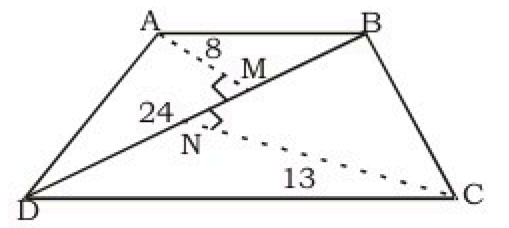
CN = 13 metres

Area of □ABCD

= ar (ΔABD) + ar (ΔBCD)

$= \left(\frac{1}{2} BD \times AM\right) + \left(\frac{1}{2} BD \times CN\right)$

$= \frac{1}{2} \times BD\left[AM + CN\right]$



$= \frac{1}{2} \times 24\left[8 + 13\right] = 12 \times 21$

Area of □ABCD = 252 metre²

273. (c) Linear equation

239x – 239y + 5 = 0

$\Rightarrow$ 239y = 239x + 5

$\Rightarrow y = \frac{239x}{239} + \frac{5}{239}$

$\Rightarrow y = 1 \times x + \frac{5}{239}$ ....(i)

$\Rightarrow y = mx + c$

Equating with equation (i)

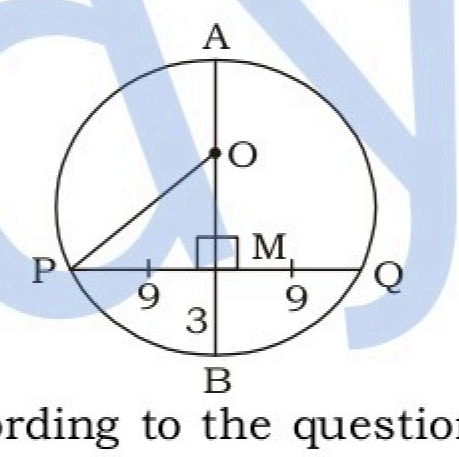
$\Rightarrow$ m = 1

$\Rightarrow \tan\theta = 1$

$\Rightarrow \tan\theta = \tan 45^\circ$

$\theta = 45^\circ$

274. (b)



According to the question,

Let OA = x = OP = OB

AB = $2x$

OM = $x - 3$

In ΔOMP,

$x^2 = (9)^2 + (x - 3)^2$

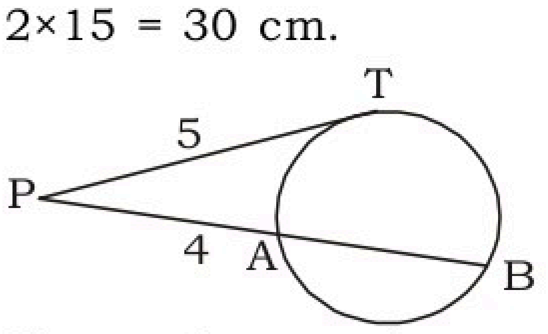
$x^2 = 81 + x^2 + 9 - 6x$

$90 = 6x$

$x = 15$

$\therefore$ AB = 2×15 = 30 cm.

275. (c)



According to the question,

PT = 5 cm.

PA = 4 cm.

PB = $(4+x)$ cm.

As we know that,

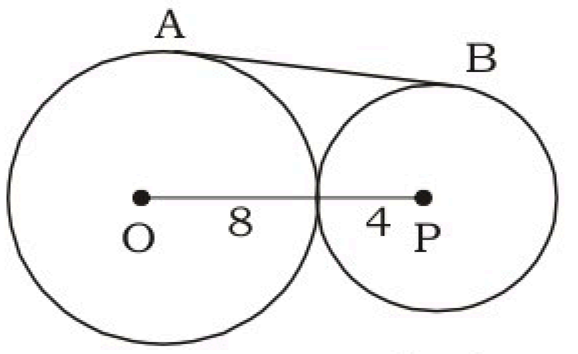
$PT^2 = PA \times PB$

$25 = 4(4 + x)$

$25 = 16 + 4x$

$x = \frac{9}{4}$ cm.

276. (c)



We know that, $AB = 2\sqrt{r_1 r_2}$

$AB = \sqrt{(OP)^2 - (8-4)^2} = 2\sqrt{8 \times 4}$

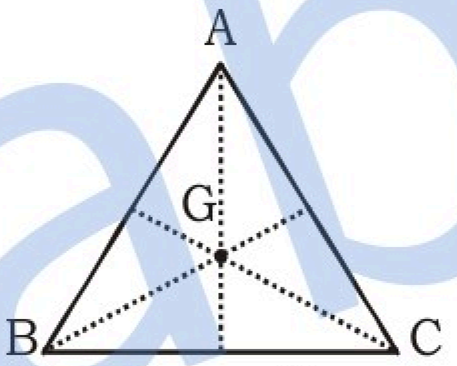
$AB = \sqrt{(12)^2 - (8-4)^2} = 2\sqrt{32}$

$AB = \sqrt{144 - 16} = 2 \times 4\sqrt{2}$

$AB = \sqrt{128} = 8\sqrt{2}$ cm

$AB = 8\sqrt{2}$ cm.

277. (d)



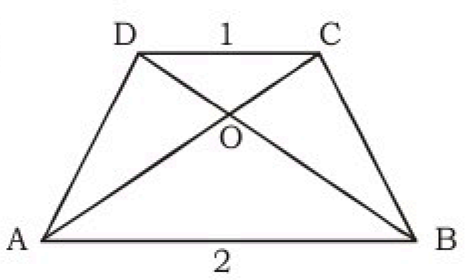
Area of ΔABC = 60 cm²

Area of ΔGBC $= 2 \times \left(\frac{1}{6} \text{ of } \Delta ABC\right)$

[A Median divides a triangle in two equal parts]

$\Rightarrow 2 \times \frac{1}{6} \times 60 = 20$ cm²

278. (a)

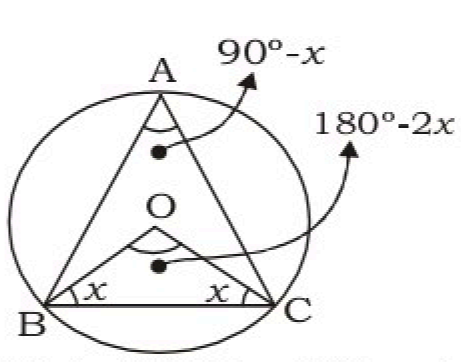


$\frac{\text{area of } \Delta COD}{\text{area of } \Delta AOB} = \frac{CD^2}{AB^2}$

$\frac{\text{area of } \Delta COD}{84} = \left(\frac{1}{2}\right)^2 \Rightarrow \frac{1}{4}$

area of ΔCOD = 21 cm²

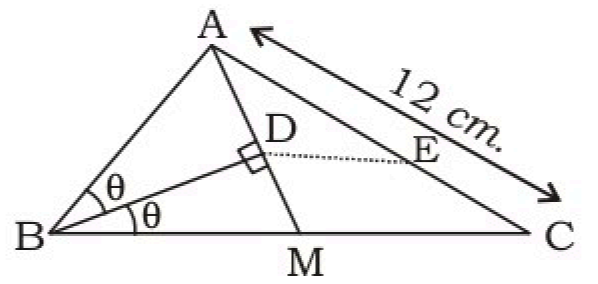
279. (c)



$\angle OBC + \angle BAC = 90^\circ - x + x$

$= 90^\circ$

280. (d)



$\angle ABD = \angle MBD = \theta$

(angle biscetor)

$\therefore BD \perp AM$

$\angle BDA = \angle BDM = 90^o$

It happen only in equilateral and isosceles triangle

$\therefore AD = DM$

i.e. $AD = AM/2$

Given DE | | BC

From thales theorem

E will be mid point of AC.

$\because$ AC = 12 cm.

So, AE = 6 cm.

281. (a) Let internal angle = x

External angle = y

$x-y = 108$ ....(i)

$x+y = 180$ .....(ii)

from equation (i) and (ii)

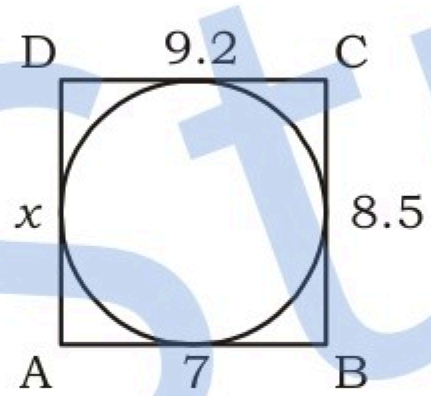
$x = 144$

$$\frac{(n-2)\times 180}{n} = 144$$

$n = 10$

Thus, number of sides of polygon is 10

282. (b)



AB + CD = BC + DA

(Property)

$\Rightarrow 7 + 9.2 = x + 8.5$

$\Rightarrow 16.2 = x + 8.5$

$x = 7.7$

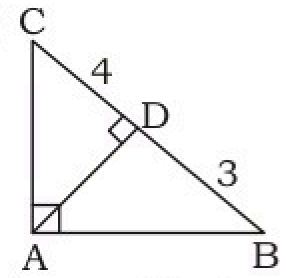
283. (b) $\dfrac{\text{area of triangle 1}}{\text{area of triangle 2}} = \dfrac{3}{2}$

$$\frac{\frac{1}{2}\times B_1 \times 4}{\frac{1}{2}\times B_2 \times 5} = \frac{3}{2}$$

$$\frac{B_1}{B_2} = \frac{3}{2}\times\frac{5}{4} = \frac{15}{8}$$

$B_1 : B_2 = 15 : 8$ Ans.

284.(a)

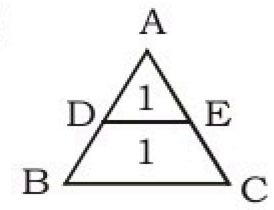


We know that,

$AD^2 = CD \times BD = 4\times 3 = 12$

$AD = 2\sqrt{3}$

285. (b)



ar of $\Delta ADE = 1$, ar of $\Delta ABC = 2$

$$\frac{\text{ar of } \Delta ABC}{\text{ar of } \Delta ADE} = \frac{2}{1}$$

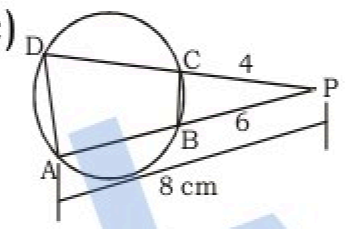
$$= \frac{\text{Side of } \Delta ABC\ (AB)^2}{\text{Side of } \Delta ADE\ (AD)^2}$$

By square root $\dfrac{\sqrt{2}}{1} = \dfrac{AB}{AD}$

$DB = AB - AD = \sqrt{2} - 1$

$DB : AB = \left(\sqrt{2} - 1\right) : \sqrt{2}$

286. (c)



$\Rightarrow$ PA.PB = PC.PD

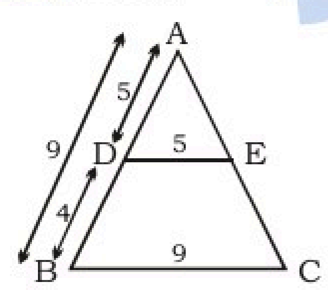
$\Rightarrow 8 \times 6 = 4 \times PD$

$\Rightarrow 48 = 4 \times PD$

$\Rightarrow 12 = PD$

PD = 12

287. (d) In ΔABC, DE | | BC



$$\frac{AE}{AC} = \frac{AD}{AB} = \frac{DE}{BC}$$

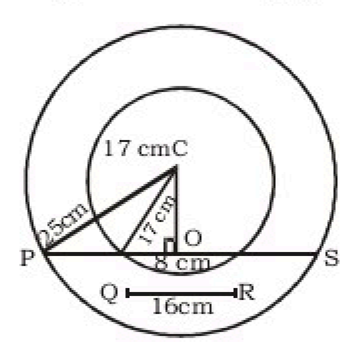
(Basic Prop. theorem)

Here, $\dfrac{AD}{DB} = \dfrac{5}{4}$

$\Rightarrow \dfrac{AD}{AB} = \dfrac{DE}{BC} = \dfrac{5}{9}$

$\Rightarrow$ DE : BC = 5 : 9

288. (d) In right ΔCOQ,



$QC^2 = OQ^2 + OC^2$ (By pt)

$17^2 = 8^2 + OC^2$

OC = 15 cm

In right ΔCOP

$CP^2 = OP^2 + CO^2$

$25^2 = OP^2 + 15^2$

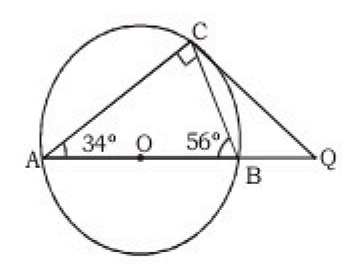
OP = 20cm

PS = 2× OP

= 2 × 20

= 40 cm

289. (a) In ΔACB



$\angle ACB = 90^o$

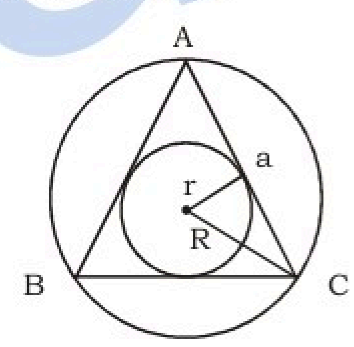
(Angle formed by semicircle is 90°)

$\angle ACB + \angle CAB + \angle CBA = 180^o$

$90^o + 34^o + \angle CBA = 180^o$

$\angle CBA = 56^o$

290. (a) Let the side of equilateral ΔABC be a & r = in-radius & R = outer radius

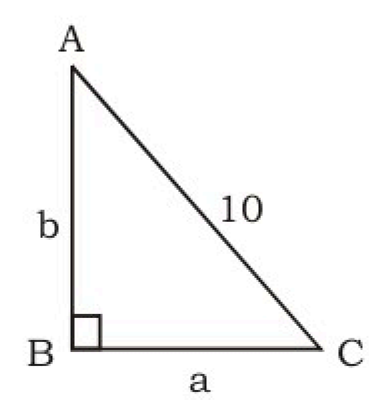


$r = \dfrac{a}{2\sqrt{3}}$ $R = \dfrac{a}{\sqrt{3}}$

$r : R = \dfrac{a}{2\sqrt{3}} : \dfrac{a}{\sqrt{3}}$

= 1 : 2

291. (c) In right ΔABC,



$a^2 + b^2 = 10^2$ (by pt).....(i)

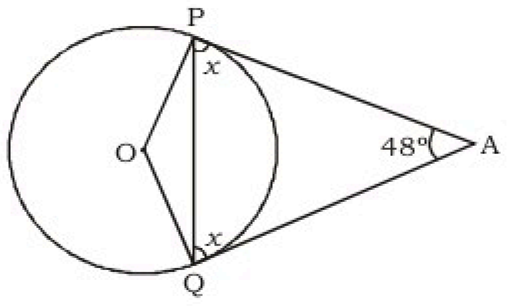
area $\Delta ABC = \dfrac{1}{2}ab = 20$

ab = 40

$(a + b)^2 = a^2 + b^2 + 2ab$

$= 10^2 + 2(40) = 180$

292. (b) In ΔAPQ, $\angle P = \angle Q = x$



$x^\circ + x^\circ + 48 = 180^\circ$

$2x = 132^\circ$

$x = 66^\circ$

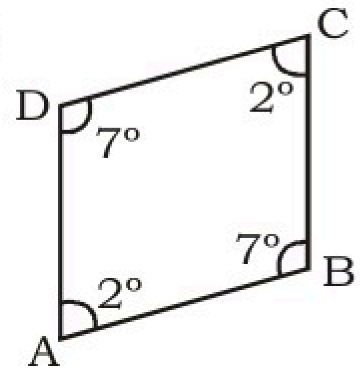
$\because \angle APQ = 66^\circ$

293. (a) $3 : 1\frac{1}{4} : 3\frac{1}{4}$

$\Rightarrow 3 : \frac{5}{4} : \frac{13}{4}$

$\Rightarrow$ 12 : 5 : 13 $\Rightarrow$ (Triplet of right angled Δ)

294. (c) ATQ



As we know that in a parallelogram opposite angle are same.

$\therefore \angle A = \angle C$

$\angle B = \angle D$

Note: A Rhombus is always a paralleogram but also paralleogram are not rhombus

295. (a) ATQ

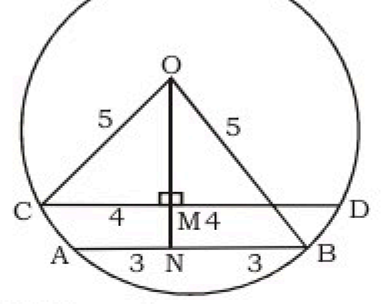
CM = MD = 4 cm

AN = NB = 3 cm

In ΔOMC

$OC^2 = MC^2 + OM^2$

$(5)^2 = (4)^2 + OM^2$



OM = 3 cm

In ΔONB

$OB^2 = ON^2 + NB^2$

$(5)^2 = ON^2 + (3)^2$

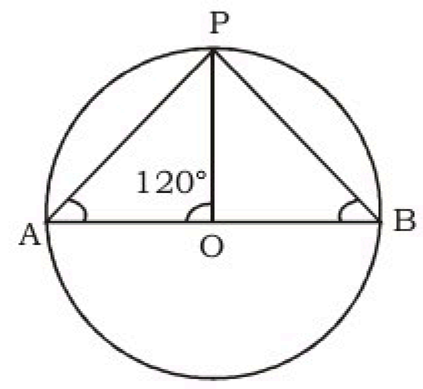
ON = 4cm

$\therefore$ MN = ON – OM

MN = 4 – 3

MN = 1 cm.

296. (b) According to the question,



$\angle POA = 120^\circ$

$\therefore \angle POB = 180 - 120^\circ$

$\angle POB = 60^\circ$

OB = OP

$\angle OBP = \angle OPB$

In ΔOPB,

$\angle POB + \angle OPB + \angle OBP = 180^\circ$

$2\angle OBP = 180 - 60^\circ$

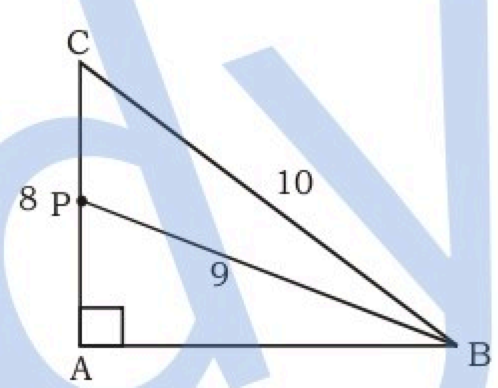
$\angle PBO = 60^\circ$

297. (b) ATQ BC = 10cm, AC = 8cm, BP = 9cm

In ΔCAB,

$BC^2 = AB^2 + AC^2$

$(10)^2 = AB^2 + (8)^2$



$AB^2 = 100 - 64$, AB = 6cm

In ΔPAB

$BP^2 = AB^2 + AP^2$

$(9)^2 = (6)^2 + AP^2$

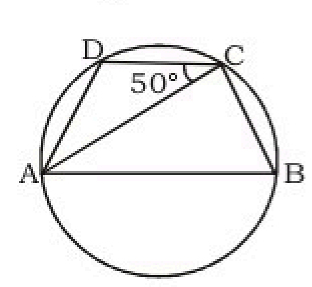
$AP^2 = 81 - 36$

$AP^2 = 45$ AP = $3\sqrt{5}$ cm

298. (b) ATQ $\angle ACD = 50^\circ$

As we know that $\angle ACB = 90^\circ$ (angle in semicircle)

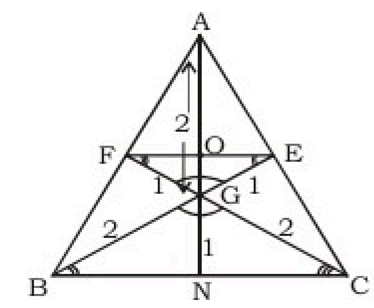
$\therefore$ In cyclic quadrilateral Sum of opposite angles is 180°



$\angle C = 140$

$\therefore \angle BAD = 180^\circ - 140^\circ = 40^\circ$

299. (a) ATQ



In Δ FEG and Δ BGC

$\frac{BG}{EG} = \frac{GN}{OG}$

$\frac{2}{1} = \frac{1}{OG}$

$OG = \frac{1}{2}$

Now, AG = 2 cm

OA = AG – OG

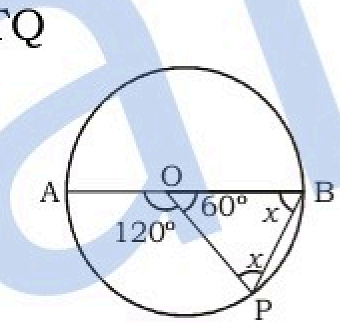
$= 2 - \frac{1}{2} = 1.5$

Hence, AO : OG

$1.5 : \frac{1}{2}$

3 : 1

300. (a)ATQ



$\because \angle AOP = 120^\circ$

$\Rightarrow \angle POB = 180^\circ - 120^\circ = 60^\circ$

$\because$ OP = OB = R

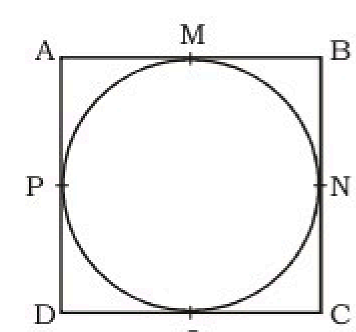
$\Rightarrow$ So Let $\angle PBO = x = \angle BPO$

$\Rightarrow x + x + 60^\circ = 180^\circ$

$\Rightarrow x = 60^\circ$

$\Rightarrow \angle PBO = 60^\circ$

301. (b)



$\Rightarrow$ According to figure

$\Rightarrow$ PA = AM

(equal tangent drawn from a external point)

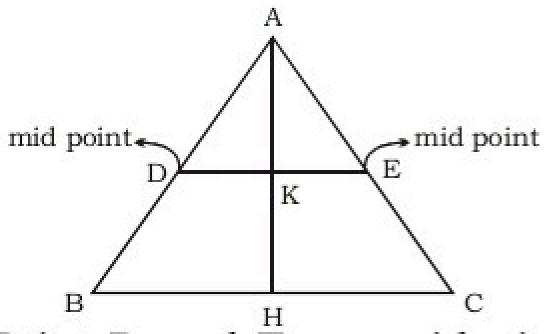
$\Rightarrow$ PD = OD

$\Rightarrow$ MB = BN $\Rightarrow$ OC = CN

$\Rightarrow \frac{(AB+CD)}{(CB+AD)}$

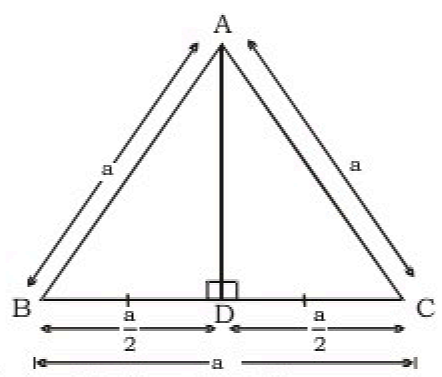
$= \frac{(AM+BM)+(OD+OC)}{(CN+NB)+(AP+DP)} = 1$

302. (b)



$\because$ Point D and E are midpoint of sides AB and AC respectively
Then DE will be parallel to BC [by thales theorem]
$\Rightarrow$ And DE, always cuts in two equal parts
$\Rightarrow$ Therefore AK : KH 1 : 1

303. (d)

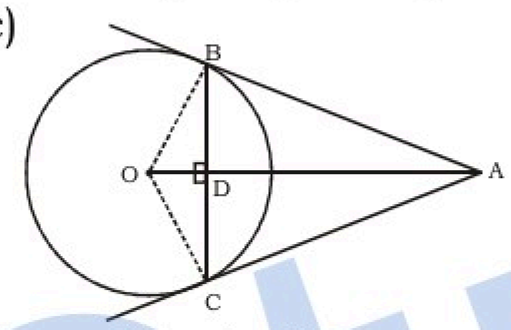


$AB^2 = AD^2 + BD^2$................. (i)
$AC^2 = AD^2 + CD^2$................ (ii)
$AB^2 + AC^2 = 2AD^2 + BD^2 + CD^2$
$AB^2 + AC^2 + BC^2$

$$= 2AD^2 + a^2 + \frac{a^2}{4} + \frac{a^2}{4} = 4AD^2$$

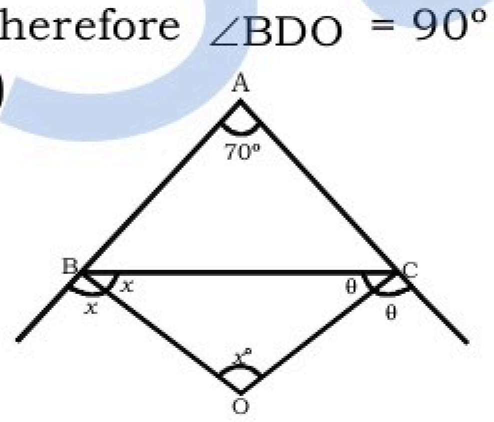
$$\left(a^2 - \frac{a^2}{4} = AD^2\right)$$

304. (c)



$\Rightarrow$According to figure
BC will be a chord of circle having centre 'O'
$\Rightarrow$OD will be perpendicular on BC
And BD = DC
$\Rightarrow$Therefore $\angle BDO = 90°$

305. (c)



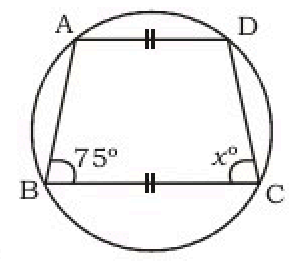
As we know
$\Rightarrow$ the external bisectors of the angles $\angle B$ and $\angle C$ meet at the point O

$$\angle BOC = 90° - \frac{\angle A}{2}$$

$$= 90° - \frac{70}{2} = 90° - 35°$$

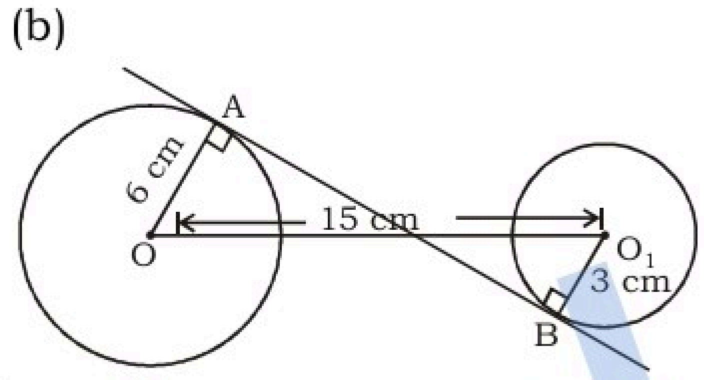
$\angle BOC = 55°$

306. (a)



According to figure
$\Rightarrow$ AD $\parallel$ BC
$\Rightarrow \angle ABC = 75$
Then
$\Rightarrow \angle ABC + \angle ADC = 180°$
$\Rightarrow 75° + \angle ADC = 180°$
$\Rightarrow \angle ADC = 180° - 75°$
$\Rightarrow \angle ADC = 105°$
$\Rightarrow$As we know in a cyclic trapezium
$\angle ADC + \angle DCB = 180°$
(AD | | BC, corresponding angle)
$\Rightarrow 105 + \angle DCB = 180°$
$\Rightarrow \angle DCB = 75°$

307. (b)



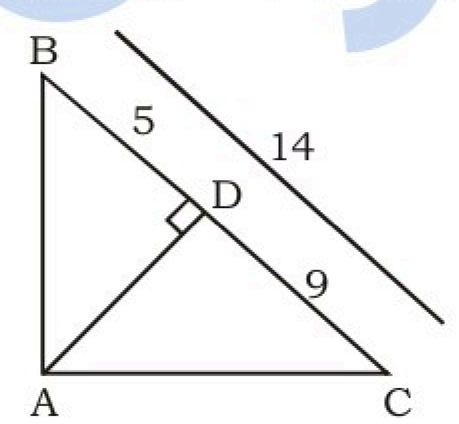
As we know
$\Rightarrow$ The length of the transverse common tangent to the circle

$$= \sqrt{(\text{Distance between centres})^2 - (R_1 + R_2)^2}$$

$$= \sqrt{(15)^2 - (6+3)^2}$$

$\Rightarrow \sqrt{225 - 81} \Rightarrow 12$ cm

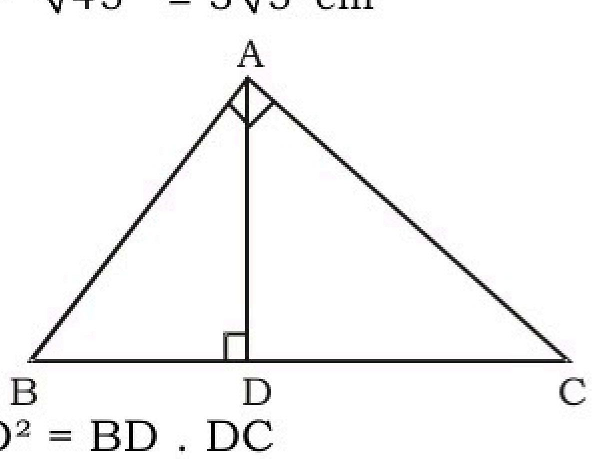
308. (b)



$AD^2 = BD \times DC = 5 \times 9$

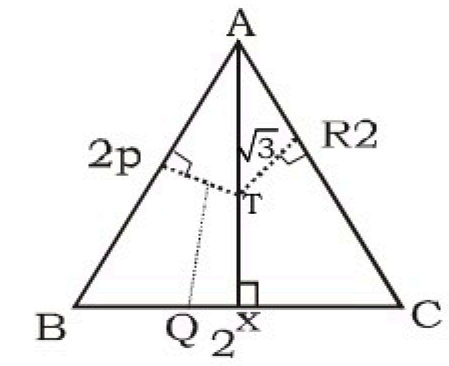
$AD = \sqrt{45} = 3\sqrt{5}$ cm

309. (b)



$AD^2 = BD \cdot DC$
$\Delta ADC \sim \Delta CAB$ (Property of a right angleΔ)
$\angle BAC = \angle ADC = 90°$

310. (d)



Let side = 2 units

$$\text{Side} = \frac{2}{\sqrt{3}}(PT + QT + TR)$$

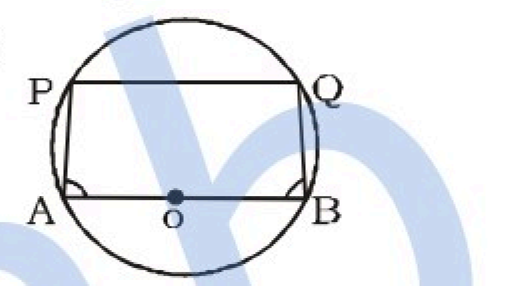
$$2 = \frac{2}{\sqrt{3}}(PT + QT + TR)$$

$\therefore PT + QT + TR = \sqrt{3}$

$$\& \quad AX = \frac{\sqrt{3}}{2} \times 2 = \sqrt{3}$$

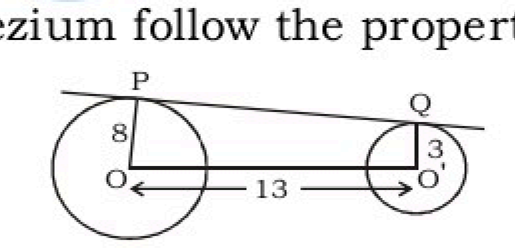
So it is equal to AX

311. (c) ATQ



$\angle A = \angle B$
AB $\neq$ PQ
AB| |PQ
$\therefore$ out of given option only cyclic trapezium follow the property.

312. (b)



$\Rightarrow$ Length of the direct common tangent PQ

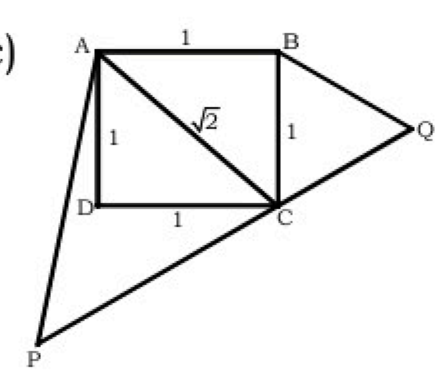
$$= \sqrt{13^2 - (8-3)^2}$$

$$= \sqrt{169 - 25}$$

$$= \sqrt{144} = 12 \text{ cm}$$

313. (a) Required ratio = 5 : 3

314. (c)



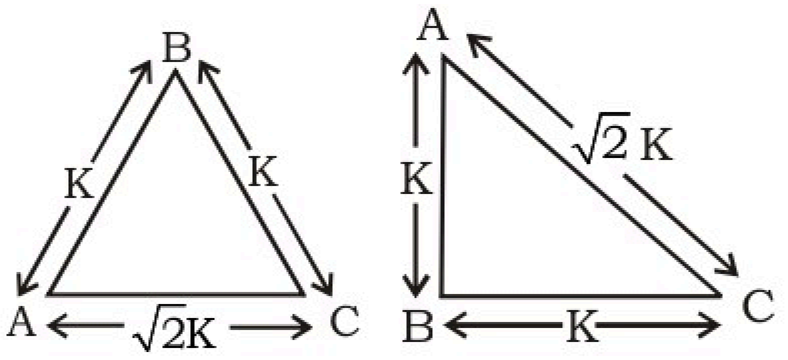
Given
$\because \Delta QBC \sim \Delta PAC$
$\Rightarrow$ Let each side of square =1
$\Rightarrow$ then diagonal of square = $\sqrt{2}$
$\Rightarrow \because \Delta QBC \sim \Delta PAC$

$$\Rightarrow \frac{\text{Area of } \Delta QBC}{\text{Area of } \Delta PAC} = \frac{(BC)^2}{(AC)^2}$$

$$= \frac{(QC)^2}{(PC)^2} = \frac{(QB)^2}{(PA)^2}$$

$$= \frac{1^2}{(\sqrt{2})^2} = \frac{1}{2}$$

315. (a)



$\because$ AB = BC = K

$\Rightarrow$ AC = $\sqrt{2}$ K

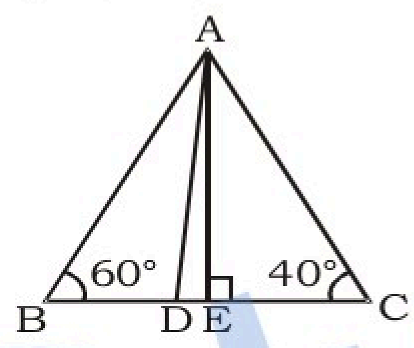
$\Rightarrow$ $(AC)^2 = (AB)^2 + (BC)^2$

$\Rightarrow$ $(\sqrt{2}\,K)^2 = K^2 + K^2$

$\Rightarrow$ $2K^2 = 2K^2$

$\Rightarrow$ Therefore ΔABC will be a Right isosceles triangle.

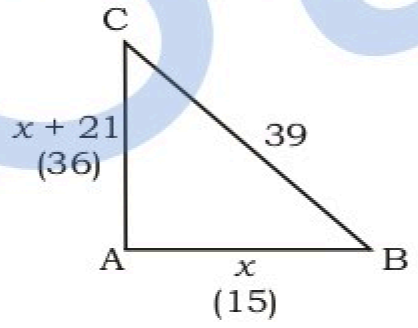
316. (c) As we know



$$\angle EAD = \frac{\angle B - \angle C}{2}$$

$$\angle EAD = \frac{60 - 40}{2}, \angle EAD = 10^\circ$$

317. (b)



In ΔABC

$x^2 + (x + 21)^2 = (39)^2$

$x^2 + x^2 + 441 + 42x = 1521$

$2x^2 + 42x - 1080 = 0$

$x^2 + 21x - 540 = 0$

$x^2 + 36x - 15x - 540 = 0$

$x(x + 36) - 15(x + 36) = 0$

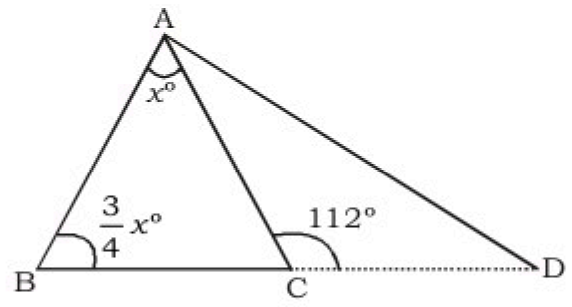
$(x - 15)(x + 36) = 0$

$x = 15$

Area of Δ $= \frac{1}{2} \times 15 \times 36$

$= 270$ cm²

318. (c)



Assume, $\angle A = x$

$\therefore \quad \angle B = \frac{3}{4}x$

$\angle A + \angle B = 112^\circ$ ($\because$ sum of two interior angle is equal to the exterior angle of the third angle)

$x^\circ + \frac{3}{4}x^\circ = 112^\circ$

$\frac{7x^\circ}{4} = 112^\circ$

$x^\circ = 64^\circ$

Hence, $\angle B = \frac{3}{4} \times 64^\circ = 48^\circ$

319. (b) Complement of an angle

$= \frac{1}{4}$ supplementary angle

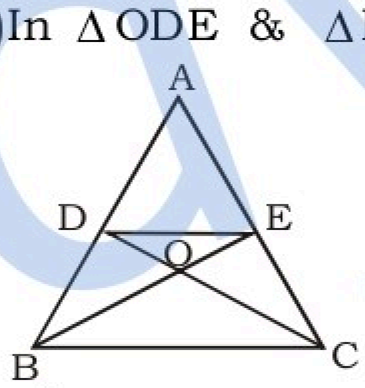
$90^\circ - \theta = \frac{1}{4}(180^\circ - \theta)$

$360^\circ - 4\theta = 180^\circ - \theta$

$3\theta = 180^\circ$

$\theta = 60^\circ$

320. (a) In ΔODE & ΔBCO



$$\frac{(OE)^2}{(OB)^2} = \frac{\text{Area of } \Delta ODE}{\text{Area of } \Delta BCO}$$

$$\frac{1}{4} = \frac{\text{Area of } \Delta ODE}{\text{Area of } \Delta BCO}$$

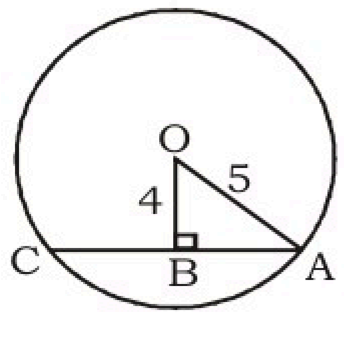
Area of ΔBCO = $\frac{1}{3}$ Area of ΔABC

4 Area of ΔODE= $\frac{1}{3}$ of ΔABC

Area of ΔABC = 12 ×area of ODE

ΔODE : ΔABC
1 : 12

321. (b)



radius = $\frac{10}{2}$ = 5cm = OA

OB = 4

By using pythagoras theorem

$OA^2 = OB^2 + AB^2$

$5^2 = 4^2 + AB^2$

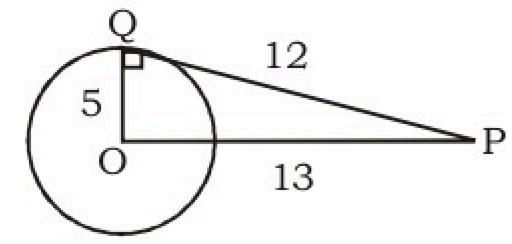
$AB^2 = 25 - 16$

AB = $\sqrt{9}$

AB = 3cm

AC = 2 × AB = 2 × 3 = 6cm

322. (d)



P Q = 12cm, O Q = 5cm

By using pythagoras theorem

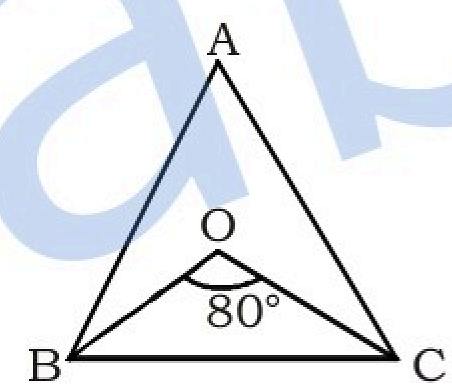
$OP^2 = OQ^2 + PQ^2$

$OP^2 = 5^2 + 12^2$

$OP^2 = 25 + 144$

OP = $\sqrt{169}$, OP = 13cm

323. (d)



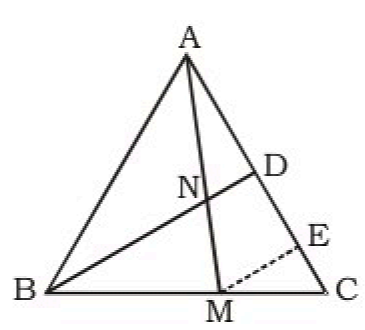
$\angle$BOC = 80°, BAC = ?

In ortho centre

$\angle$BAC = 180° – $\angle$BOC

= 180° – 80° = 100°

324. (a)



ar ΔAMC = $\frac{1}{2}$ ar ΔABC $\because$ M is the the midpoint.

Draw ME| |BD

In ΔBCD and ΔCEM

$\because$ ME | | BD

$\Rightarrow$ ΔBCD ~ ΔCEM

and

$\because$ M is the mid-point.

$\therefore$ DE = EC ..... (i)

In $\triangle$ AME and $\triangle$ AND

$\because$ ME | | ND

$\Rightarrow \triangle AME \sim \triangle AND$

and $\because$ N is the mid point.

$\Rightarrow$ AD = DE ...... (ii)

and $\frac{ar\triangle AND}{ar\triangle AME} = \frac{AD^2}{AE^2}$

$= \left(\frac{1}{2}\right)^2 = \frac{1}{4}$ ..... (iii)

From (i) and (ii)

AD = DE = EC

$\Rightarrow$ ME bisects AC in the ratio 2 : 1

$\Rightarrow$ ME also bisects the area of $\triangle$ AMC in the ratio 2 : 1

$\Rightarrow$ area of $\triangle$ AME $= \frac{10}{3} \times 2$

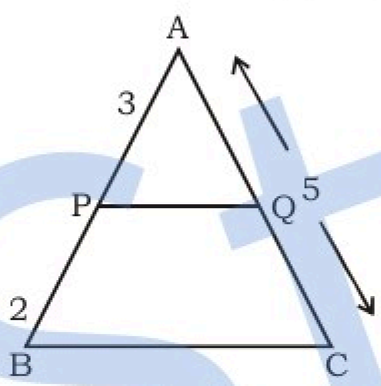
$= \frac{20}{3}$ sq.units

From (iii)

Area $\triangle$ AND $= \frac{20}{3} \times \frac{1}{4} = \frac{5}{3}$

= 1.67 sq.units

325.(c)

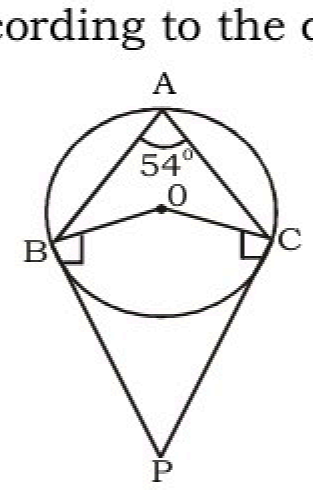


According to the question.

$\frac{AP}{AB} = \frac{3}{5}$

$\frac{\text{area of } \triangle APQ}{\text{area of } \triangle ABC} = \frac{AP^2}{AB^2} = \frac{9}{25}$

326.(c) According to the question.



$\angle BOC = 2\angle A$

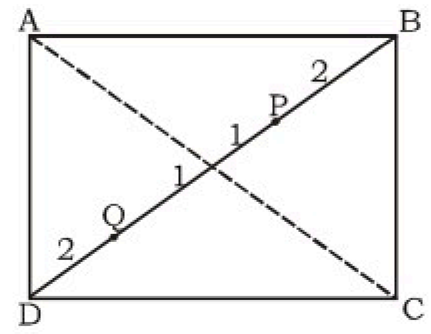
$\angle BOC = 2 \times 54^0 = 108^0$

$\angle BPC = 180^0 - \angle BOC$

$\angle BPC = 180^0 - 108^0 = 72^0$

327.(a) According to the question.

BD = 12 cm



6 units $\longrightarrow$ 12

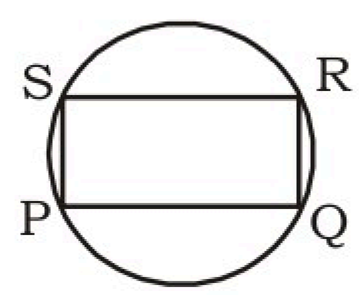
1 unit $\longrightarrow \frac{12}{6} = 2$

$\therefore$ Length of PQ = 2 units

$= 2 \times 2 = 4$ cm.

328. (a) According to the question

PQRS is a cyclic quadrilateral As we know that the sum of opposite angles in cyclic quadrilateral is 180°



$\angle P = 1x$

$\angle Q = 3x$

$\angle R = 4x$

$\therefore$ 5 units $\rightarrow$ 180°

1 unit $\rightarrow \frac{180}{5}$

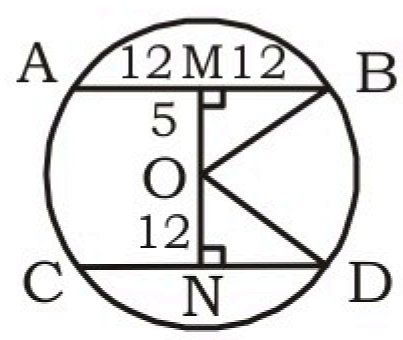
3 units $\rightarrow \frac{180}{5} \times 3 = 108°$

$\angle S + \angle Q = 180°$

$\angle S = 180° - 108° = 72°$

329. (c) According to the question

In $\triangle$ OBM



$OB^2 = OM^2 + MB^2$

$OB^2 = 12^2 + 5^2$

OB = 13 = OD

In $\triangle$ OND

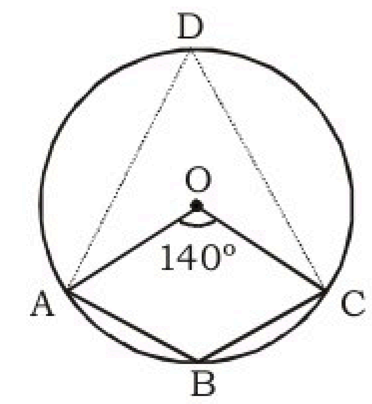
$OD^2 = ON^2 + ND^2$

$(13)^2 = (12)^2 + ND^2$

ND = 5

CD = 2 × ND = 2 × 5 = 10 cm

330. (b)



$\angle AOC = 2 \times \angle ADC$

[Center angle is double of the major angle]

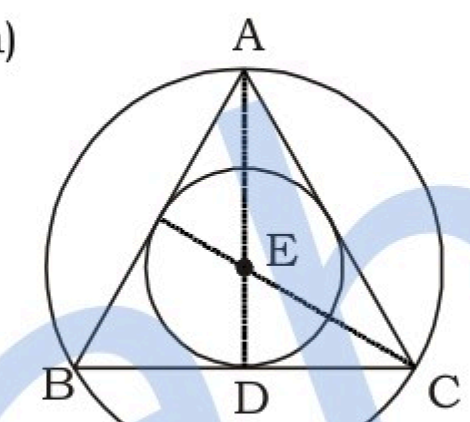
$\angle ADC = \frac{140}{2} = 70°$

$\angle ABC + \angle ADC = 180°$

$\angle ABC + 70° = 180°$

$\angle ABC = 110°$

331. (a)



AE : ED = 2 : 1

$\therefore$ DE is inradius & AE is cirumradius

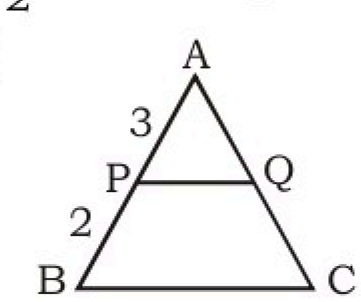
Required Ratio

$= \frac{Inradius}{Circumradius} = \frac{1}{2}$

332. (d) $\frac{area(\Delta ABC)}{area(\Delta PMR)}$

$= \frac{(7)^2}{\frac{1}{2} \times (4)^2} = \frac{49}{8}$

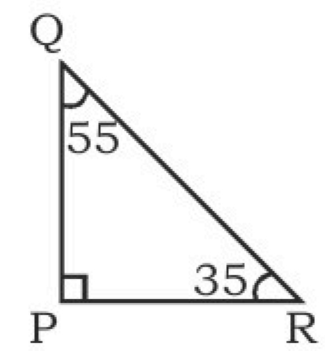
333. (a)



$\frac{AP}{PB} = \frac{AQ}{QC}$

$\frac{AQ}{QC} = \frac{3}{2}$

334. (d)

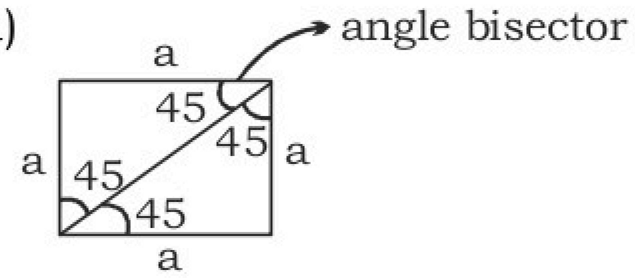


circumcentre at the mid point of QR hence angle made by QR
= 2 × 90° = 180°
Angle made by QR at In centre

$= 90° + \frac{1}{2} \times \angle P = 135°$

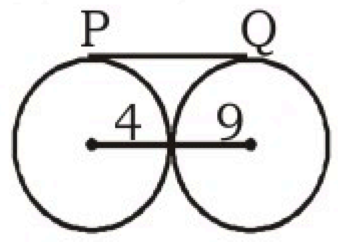
ortho centre is at point 'P'
Hence angle made by QR = 90
Then ratio C : I : 0
= 180 : 135 : 90
= 4 : 3 : 2

335. (a)



both part are congruent

336. (b) Length of common tangent



$PQ = 2\sqrt{Rr}$

$= 2\sqrt{9 \times 4} = 12$cm

337. (b) $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = 13$

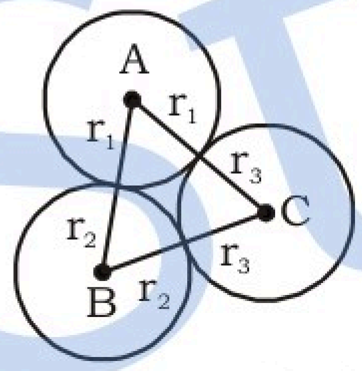
$= \sqrt{(x-0)^2 + (0-(-5))^2} = 13$

$= x^2 + 25 = 169$

$x^2 = 144$

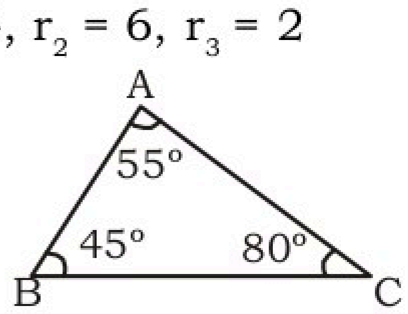
$x = 12$ units.

338. (c)



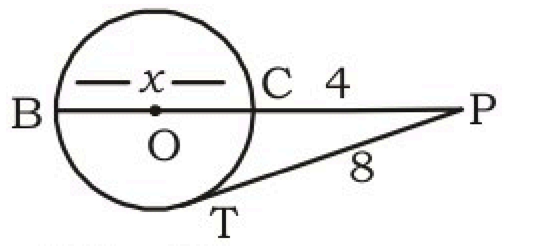
Let radius of 3 circles be r_1, r_2 & r_3.
So,
$r_1 + r_2 = 10$
$r_2 + r_3 = 8$
$r_3 + r_1 = 6$
After solving, we get
$r_1 = 4$, $r_2 = 6$, $r_3 = 2$

339. (d)



As $\angle C > \angle A > \angle B$.
then, AB > BC > AC.
(Opposite sides of corresponding angles)

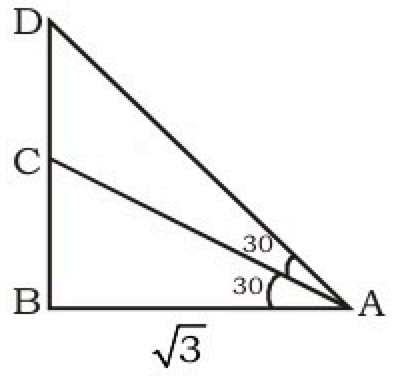
340. (b)



$PT^2 = PC \times PB$
$64 = 4 \times (4 + x)$
$x = 12$ cm

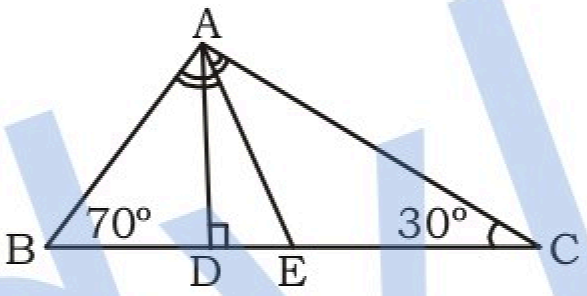
Hence radius $= \frac{x}{2} = \frac{12}{2} = 6$ cm

341. (d)



In Δ ABD
$\angle D = 180° - (\angle A + \angle B)$
= 180° – (90 + 60) = 30°
In ΔACD
$\angle A = 30° = \angle D$
So, CA = CD

342. (d)

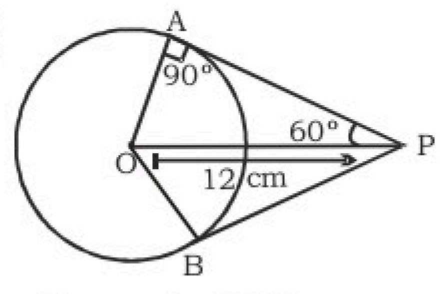


$\angle A = 180° - (\angle B + \angle C)$
$= 180° - 100° = 80°$

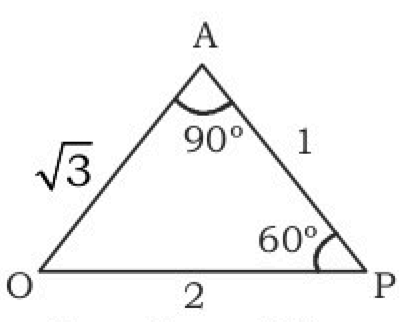
$\angle BAE = \angle EAC = \frac{1}{2} \angle A = 40°$

In Δ BAD
$\angle BAD = 90° - \angle B$
$= 90° - 70° = 20°$
$\angle DAE = \angle BAE - \angle BAD$
$= 40° - 20° = 20°$

343.(b)

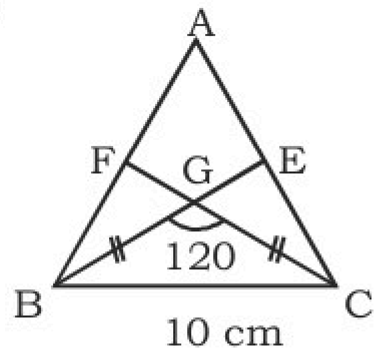


Now from Δ AOP



2 units = 12 cm
1 unit = 6 cm
hence the length of tangent
= 6 cm

344.(d)



In ΔBGC
$\angle BGC = 120°$
BG = GC
Then $\angle GBC = \angle GCB$

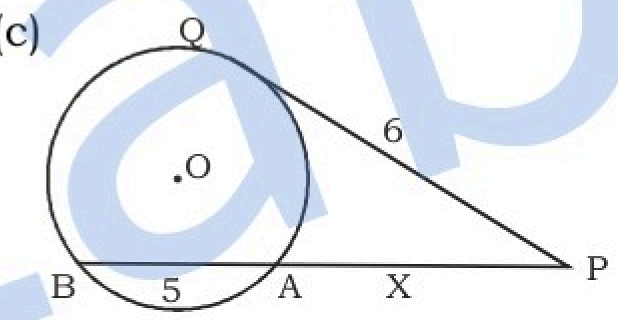
$\angle GBC = \frac{180-120}{2} = 30°$

Then $\angle B = 30 \times 2 = 60°$
$\angle C = 30 \times 2 = 60°$
$\angle A = 60°$
$\therefore \Delta$ ABC

Area of $\Delta ABC = \frac{\sqrt{3}}{4} \times 10 \times 10$

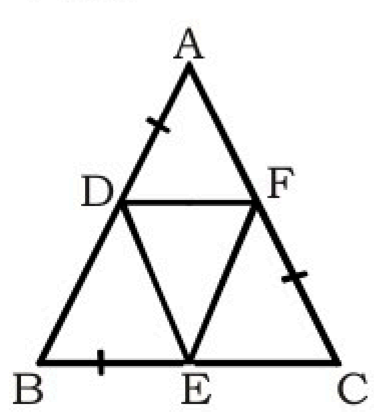
$= 25\sqrt{3}$

345.(c)



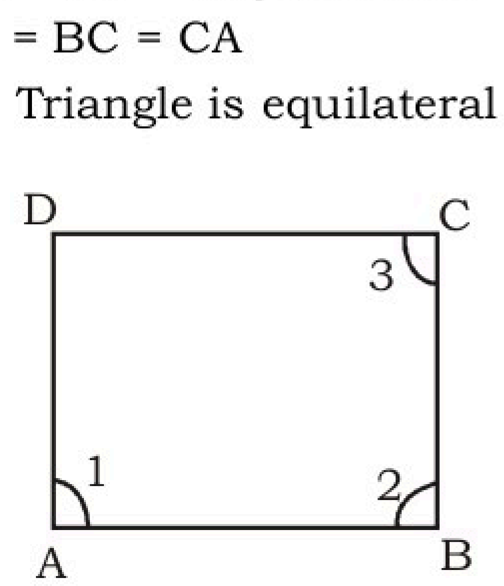
$PQ^2 = PA \times PB$
$(6)^2 = x \times (x + 5)$
$x^2 + 5x - 36 = 0$
$x^2 + 9x - 4x - 36 = 0$
$(x-4)(x+9) = 0$
$x = 4$ cm

346. (a)



Given in question AD = BE = CF
[DB = AF = EC] Because
AB = BC = CA
So, Triangle is equilateral

347.(a)



$\angle A + \angle B + \angle C = \angle D$

$x + 2x + 3x = \angle D$

$\angle D = 6x$

Now,

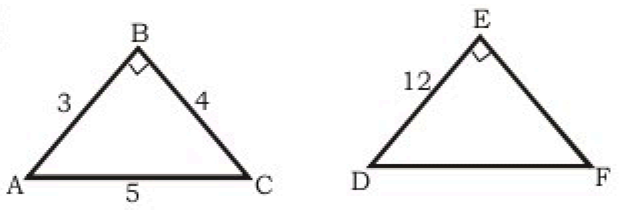
$\angle A + \angle B + \angle C + \angle D = 360$

$x + 2x + 3x + 6x = 360$

$12x = 360^\circ$

$x = 30^\circ = \angle A$

348. (d)



Perimeter of ΔABC

$= 3 + 4 + 5 = 12$

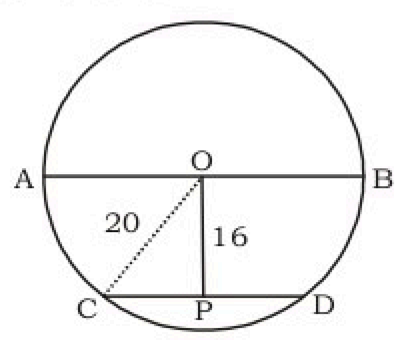
$$\frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta DEF} = \frac{AB}{DE}$$

$$\frac{12}{\text{Perimeter of } \Delta DEF} = \frac{3}{12}$$

Perimeter of ΔDEF = 48 cm

349. (c) centroid

350. (c)



$OC^2 = OP^2 + CP^2$

$(20)^2 = (16)^2 + CP^2$

$\Rightarrow CP^2 = (20)^2 - (16)^2$

$\Rightarrow CP = 12$

$\therefore$ Length of chord = 24

351. (c) Let side of polygon = x

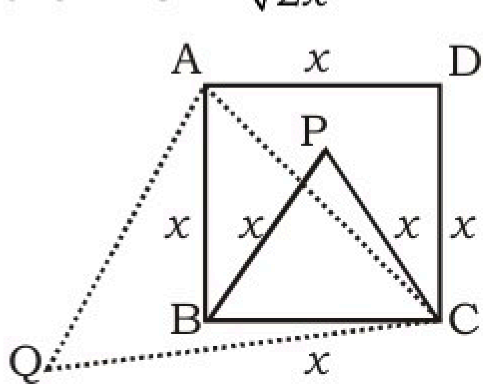
interior – exterior = 90°

$$\frac{(n-2)\times 180}{n} - \frac{360}{n} = 90^\circ$$

n = 8

352. (a) Let side of square is x

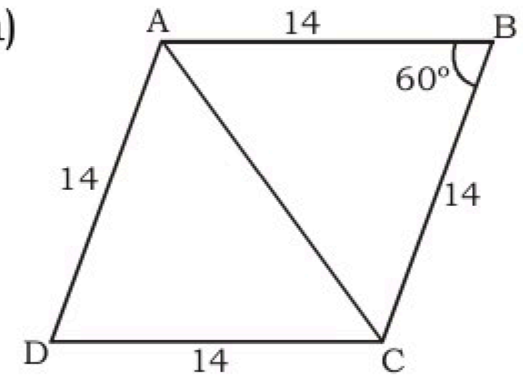
then AC = $\sqrt{2}x$



$$\frac{\text{Area of } \Delta PBC}{\text{Area of } \Delta QAC} = \frac{\frac{\sqrt{3}}{4}x^2}{\frac{\sqrt{3}}{4}(\sqrt{2}x)^2}$$

$$\frac{A_1}{A_2} = \frac{1}{2}$$

353. (a)



$\angle ABC = 60^\circ$ (given)

$\angle DAB = \angle DCB = 120^\circ$

(as $\angle ABC + \angle DAB = 180^\circ$)

$$\angle CAB = \frac{1}{2} \times \angle DAB = 60^\circ$$

$$\angle ACB = \frac{1}{2} \times \angle DCB = 60^\circ$$

In ΔABC

all 3 angles are 60°

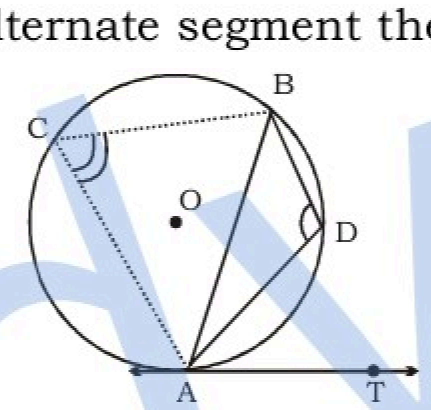
means it is an equilateral Δ

So, AC = AB = BC = 14

354. (b) Let take a point 'C' on circumference of circle

Then $\angle BAT = \angle BCA = 50^\circ$

(Alternate segment theorem)



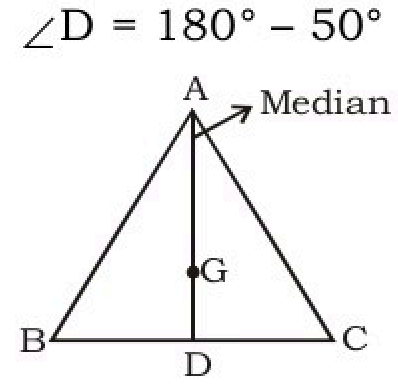
In Cyclic Quatrilateral □ACBD

$\angle D = 180 - \angle C$

(In a cyclic quatrilateral the sum of opposite angles is 180°)

Then $\angle D = 180^\circ - 50^\circ = 130^\circ$

355. (c)



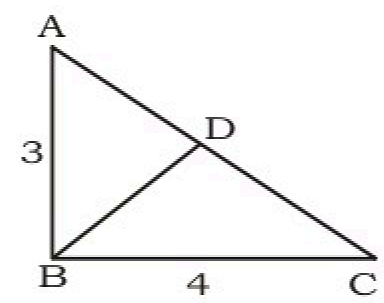
AG : GD = 2 : 1

×5 ×5

10 5

Total AD = 10 + 5 = 15 cm

356. (c)



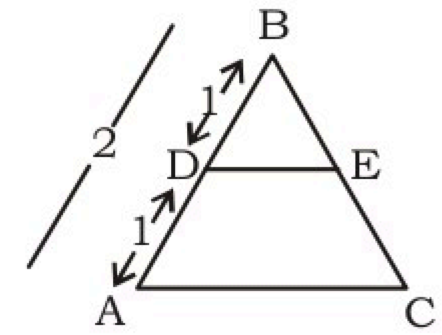
$AC = \sqrt{3^2 + 4^2} = \sqrt{9+16}$

AC = 5

$\because$ D is circum center It is equidistant from all the center

so $AD = CD = BD = \frac{5}{2} = 2.5$ cm.

357. (d)



AB = 2 AD

$$\frac{\text{Ar. of } \Delta BDE}{\text{Ar. of } \Delta ABC} = \frac{(BD)^2}{(AB)^2}$$

$$= \frac{(BD)^2}{(2BD)^2} = \frac{1}{4}$$

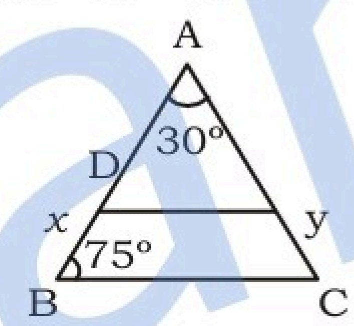
So

Ar. of trapezium = Ar. of Δ ABC – Ar. of Δ BDE

= 4 – 1 = 3

Required Ratio = 4:3

358. (d)



If $\angle A = 30^\circ$

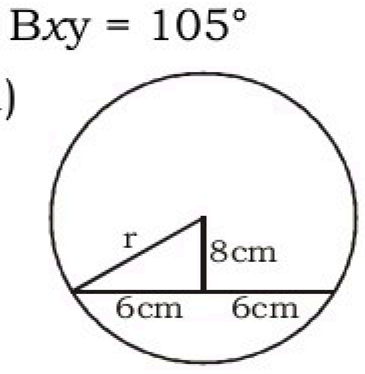
then $\angle ABC = \angle ACB$

$$= \frac{180-30}{2} = 75^\circ$$

$\angle Bxy = 180^\circ - \angle ABC = 180^\circ - 75^\circ$

$\angle Bxy = 105^\circ$

359. (d)



From the fig = $r = \sqrt{6^2 + 8^2}$

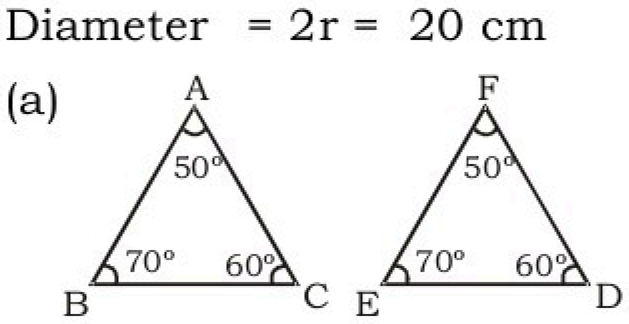
$= \sqrt{36+64}$

$r = \sqrt{100}$

r = 10 cm

Diameter = 2r = 20 cm

360. (a)



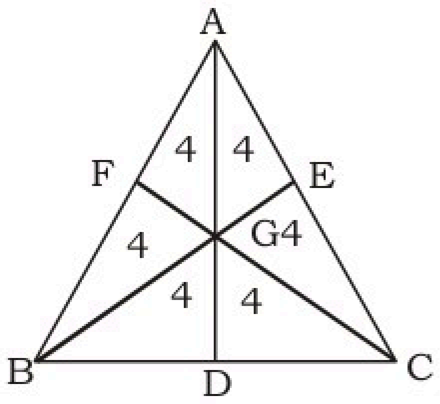
From fig It is clear

= $\Delta ABC \sim \Delta FED$

361. (a) Let area of $\triangle ABC = 24$

Area of $\triangle BGD = \frac{1}{6}$ area of $\triangle ABC$

$= \frac{1}{6} \times 24 = 4$



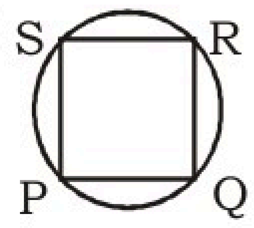
$\triangle BGD$: $\square GDCE$

Area $\Rightarrow$ 4 : 4 + 4

4 : 8

1 : 2

362.(c)



$\angle P + \angle R = 180°$ (Cyclic opposite angle)______(i)

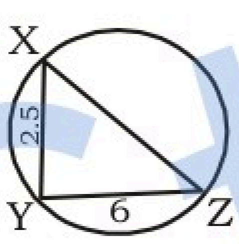
$\angle Q + \angle S = 180°$ (Cyclic opposite angle)________(ii)

From equation (i) and (ii)

$\angle P + \angle Q + \angle R + \angle S$

$= 180° + 180° = 360°$

363. (b)



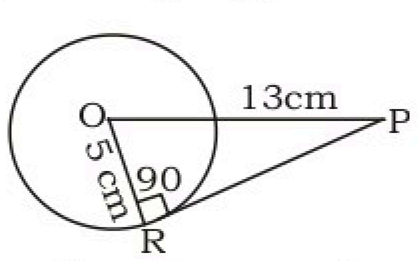
$XZ = \sqrt{6^2 + (2.5)^2}$

$= \sqrt{36 + \frac{25}{4}} = \frac{13}{2}$

circumcentre $= \frac{1}{2}$ Hypotenuse

$= \frac{1}{2} XZ = \frac{1}{2} \times \frac{13}{2} = 3.25$ cm

364. (c)



According to question,

OP = 13 cm and OR = 5 cm

$\angle ORP = 90$

($\because$ line drawn on tangent from center made an angle of 90° with tangent

$RP^2 = OP^2 - OR^2$

$\therefore RP^2 = OP^2 - OR^2$

$RP^2 = 13^2 - 5^2 = 169 - 25$

$RP^2 = 144$

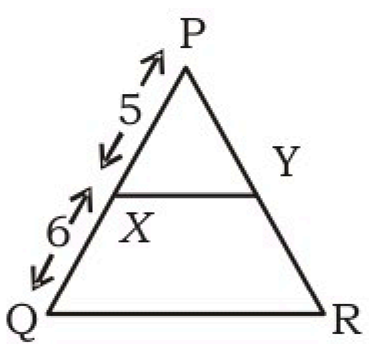
$\boxed{RP = 12}$ cm

365. (a) G is centroid which divides medians in the ratio of 2:1

In case of equilateral triangle length of median $= \frac{\sqrt{3}a}{2}$

$AG = \frac{\sqrt{3}}{2} \times 9 \times \frac{2}{3} = 3\sqrt{3}$ cm

366. (a) $\because \triangle PQR \sim \triangle PXY$

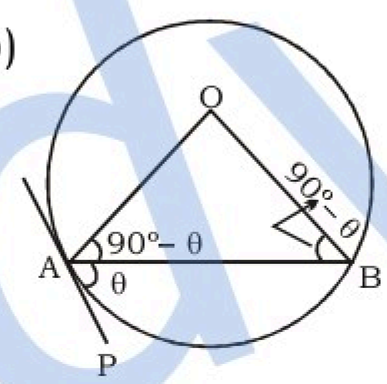


$\frac{PX}{PQ} = \frac{XY}{QR}$

$\frac{5}{(5+6)} = \frac{XY}{QR}$

$xy : QR = 5:11$

367. (b)



$\angle BAP = \theta$

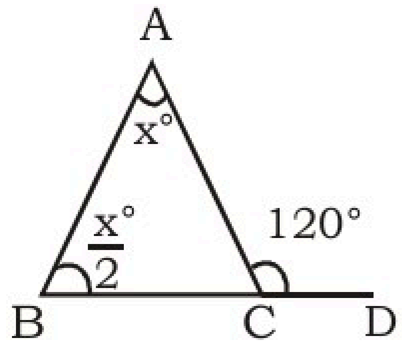
$\angle OAP = 90°$

$\therefore \angle OAB = 90° - \theta$

$\angle OAB = \angle ABO = 90° - \theta$

($\because$ OA = OB)

368. (c)



$\angle C = 180 - 120° = 60°$

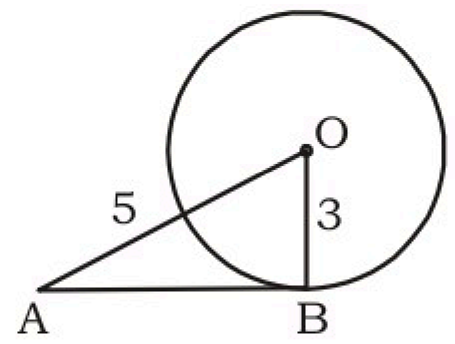
$\angle A + \angle B + \angle C = 180°$

$\angle A + \frac{1}{2}\angle A + 60° = 180°$

$\frac{3}{2}\angle A = 120°$

$\angle A = 80°$

369. (d)



in $\triangle AOB$

$AB^2 = AO^2 - OB^2$

$= 5^2 - 3^2 = 25 - 9$

$AB = \sqrt{16}$

AB = 4 cm

370. (d) Let the length of equal side = G

Perimeter

$\Rightarrow G + G + 2x - 2y + 4z$

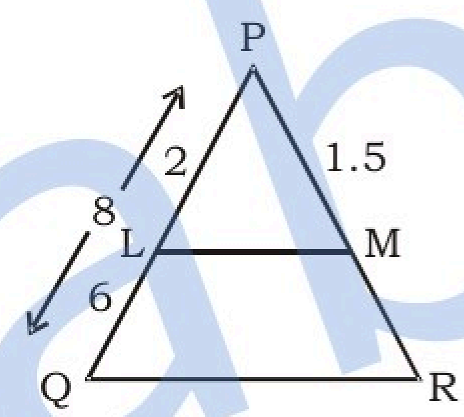
$= 4x - 2y + 6z$

$2G = 2x + 2Z$

$G = x + z$

So length of equal sides = x + z

371. (b)



$\triangle PQR \sim PLM$

So, $\frac{PL}{PQ} = \frac{PM}{PR}$

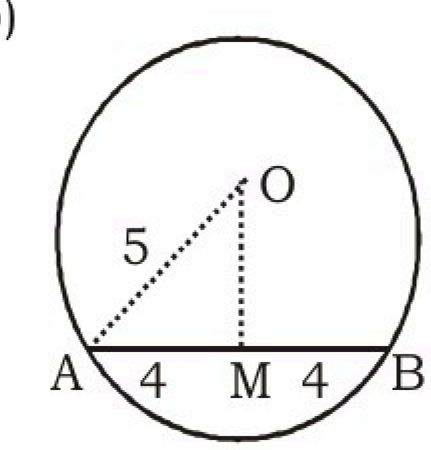
$\frac{2}{8} = \frac{1.5}{PR}$

$PR = 1.5 \times 4 = 6.0$

$MR = PR - PM$

$= 6.0 - 1.5 = 4.5$ cm

372. (b)



AB = 8

then AM = MB = 4

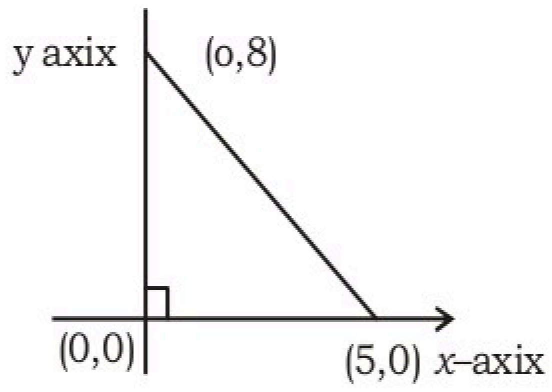
in $\triangle AOM$

$(OM)^2 = (AO)^2 - (AM)^2$

$OM^2 = 25 - 16 = 9$

$\boxed{OM = 3cm}$

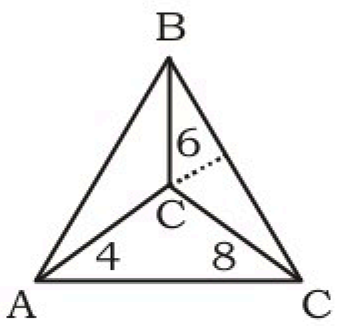
373. (c)



Area of the triangle = $\frac{1}{2} \times 5 \times 8$

= 20 sq. units

374. (c)



We know that centroid divides medians in 2:1

Then length of smallest median=

2 units – 4

1 unit – 2

3 units → 6 = 6 cm

375. (d) Ratio of Angle $= 1 : \frac{2}{3} : 3$

$\therefore \quad x + \frac{2x}{3} + 3x = 180°$

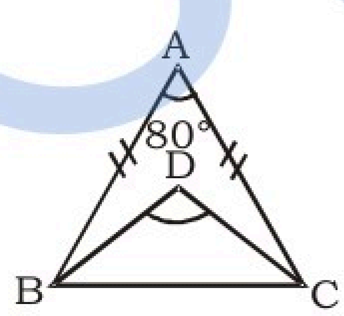
$3x + 2x + 9x = 540°$

$x = \frac{540}{14}$

Smallest angle $= \frac{540}{14} \times \frac{2}{3}$

$= \frac{180°}{7} = 25\frac{5°}{7}$

376. (c)



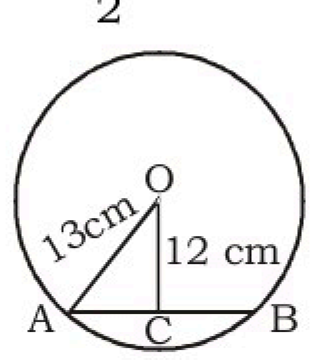
∵ AB = AC

point D is the incentre

$\therefore \quad \angle BDC = 90° + \frac{1}{2}\angle A$

$= \quad 90° + \frac{1}{2} \times 80 = 90° + 40° = 130°$

377. (a)



R = AO = 13

OC = 12

$AC = \sqrt{13^2 - 12^2} = \sqrt{25}$

AC = 5

AB = 10 cm

378. (c) $\angle A + \angle B + \angle C = 180°$

(for a triangle)

$\angle A + \angle C = 140°$

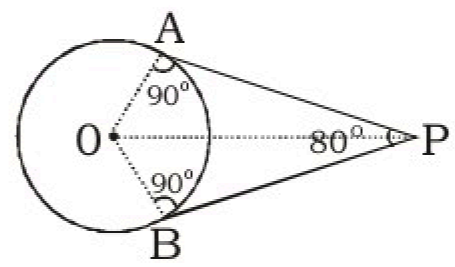
then, $\angle B = 40°$

$\angle A + 3\angle B = 180°$

$\angle A + 120° = 180°$

$\Rightarrow \angle A = 60°$

379. (b)



$\angle AOB = 360 - (90 + 90) - 80$

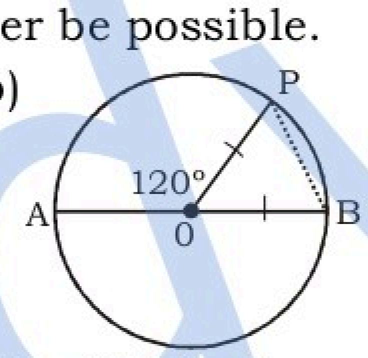
$\angle AOB = 180 - 80 = 100$

then, $\angle AOP = \frac{100}{2} = 50$

380. (b) For a triangle sum of 2 sides is always greater than the third side.

Hence, combination (5, 8, 15) never be possible.

381. (b)



OP = OB (both are radius)

$\angle POB = 180 - 120 = 60$

So, PBO $= \frac{120}{2} = 60°$

382. (c) Ratio of their radius

$= \frac{r_1}{r_2} = \frac{1}{3}$

Ratio of their arc = 2 : 1

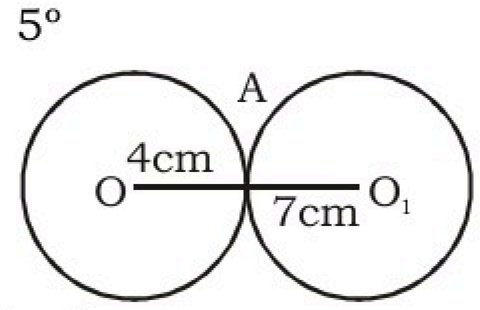
Let angle subtended by the arc of 2nd circle is 'θ'

Then,

$\frac{30}{\theta} = \frac{2/1}{1/3} = \frac{6}{1}$

$\theta = 5°$

383. (a)

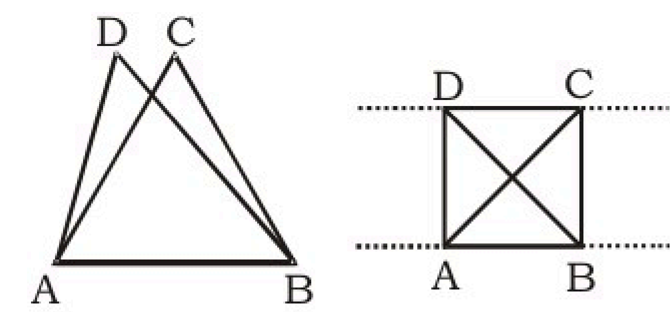


OO^1 = 7cm

OA = 4 cm

$AO^1 = 7 - 4 = 3$ cm.

384. (d)



The height of ΔABC and ΔABD are same and have same base.

∴ area ΔABC = area ΔABD

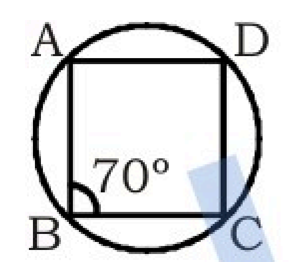
385. (b) $a^2 + b^2 + c^2 = ab + cb + ca$

This is true only when a = b = c

so, triangle will be equilateral

386. (b) orthocenter is a point where the altitudes meet

387. (c)



$\angle B + \angle A = 180$

(Property of trapezium)

$\angle A = 180° - 70°$

$\angle A = 110°$

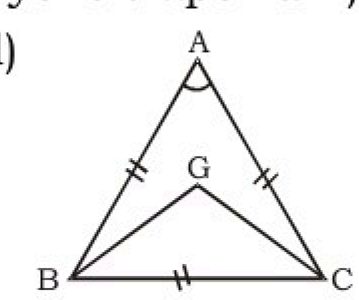
Now,

$\angle A + \angle C = 180°$

$\angle C = 70°$

(Cyclic trapezium)

388. (d)

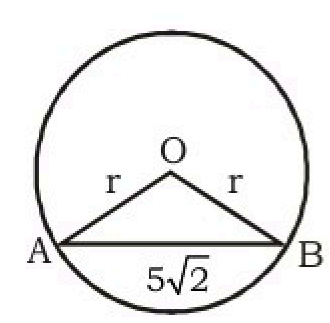


∴ AB = BC = CA

$\angle BAC = 60°$

So, $\angle BGC = 90 + \frac{60}{2} = 120°$

389. (b)



AO = OB = r

$\therefore \angle OAB = \angle OBA$

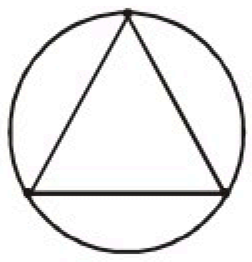
From $\Delta ABO \Rightarrow \left(5\sqrt{2}\right)^2 = r^2 + r^2$

$50 = 2r^2$

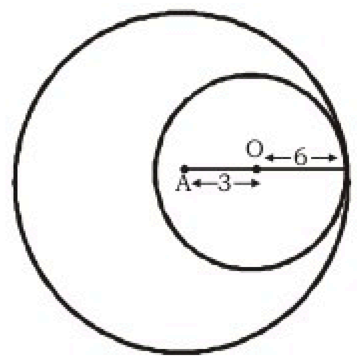
$r^2 = 25$

r = 5 cm

390. (a) Only one (1) circle can be drawn through three non-collinear points



391. (b)



Let the centre of small and large circle are O and A respectively

Give OA = 3, AB = 6

So, radius of larger circle = OB

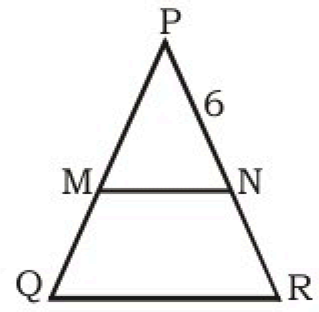
= OA + AB

= 6 + 3 = 9 cm

392. (b) $\because \Delta PQR \sim \Delta PMN$

$\because \Delta PQR$ is equilateral

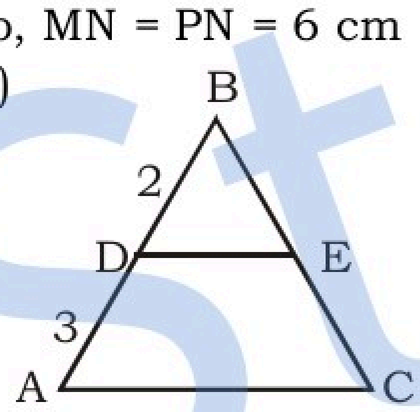
$\therefore$ PQ = PR = QR



So, ΔPMN must be equilateral

So, MN = PN = 6 cm

393. (a)

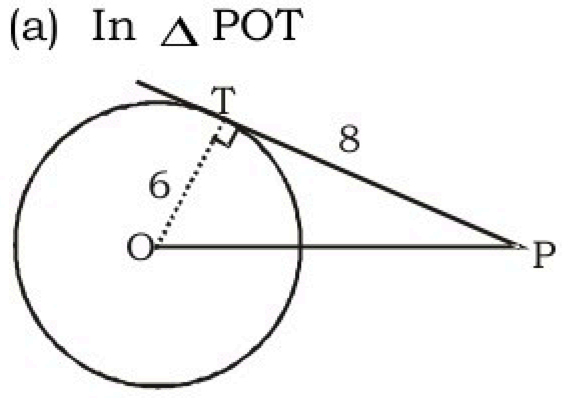


$\frac{BD}{AD} = \frac{BE}{EC}$

$\frac{2}{3} = \frac{BE}{EC}$

BE : EC = 2 : 3

394. (a) In $\triangle$ POT



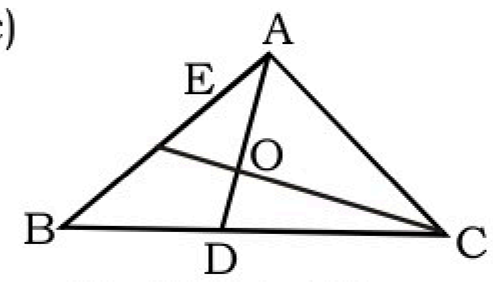
$OP^2 = PT^2 + OT^2$

$= 8^2 + 6^2 = 64 + 36$

$OP = \sqrt{100}$

OP = 10 cm

395. (c)



Given, that BD & CE are medians so, O will be centroid and Centroid divides the median in the ratio of 2 : 1

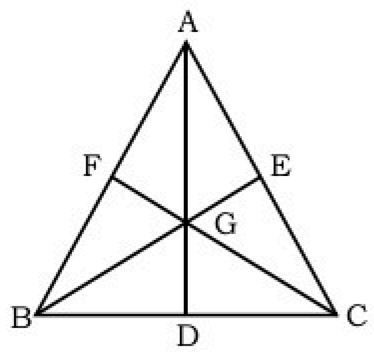
Hence, OC : EO = 2 : 1

EC = OC + EO = 3 unit

OE = 1 unit = 7

EC = 3 unit = 3 × 7 = 21 cm.

396. (c)



Area of $\triangle$ CGE = $\frac{1}{6}$ $\triangle$ ABC

$= \frac{1}{6} \times 36 = 6$ sq.cm

397. (b) If triangle's side are a, b, c then must be :-

a + b > c

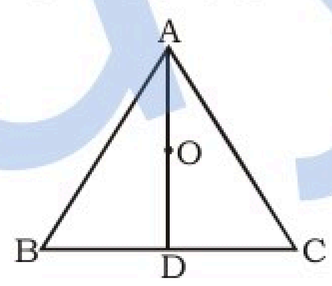
or a – b < c

only option (b) satisfy

3 + 4 > 5

7 > 5

398. (a) If O is centre



then $\frac{AO}{OD} = \frac{2}{1}$

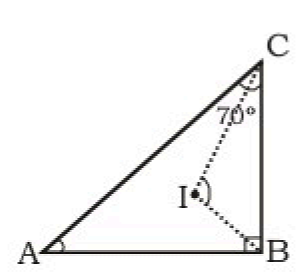
2 Unit = 10 cm

So, OD = 1 Unit = 5cm

399. (b) $\because$ Sum of all angles of a triangle = 180°

So, $\angle BAC = 180 - (90 + 70)$

$= 20°$

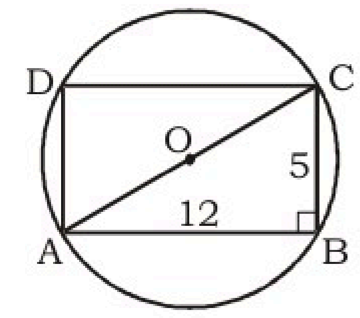


So, $\angle BIC = 90 + \frac{1}{2} \angle A$

$= 90° + \frac{1}{2} \times 20°$

$\angle BIC = 100°$

400. (b)



$AC = \sqrt{AB^2 + BC^2}$

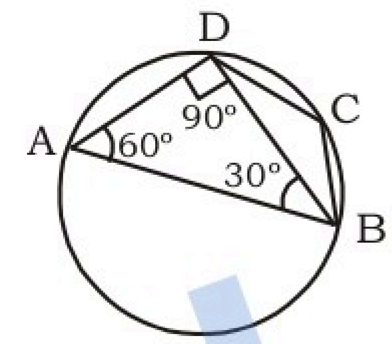
$= \sqrt{(12)^2 + (5)^2} = \sqrt{144 + 25}$

AC = 13

$\Rightarrow AO = \frac{AC}{2}$

$= AO = \frac{13}{2} = 6.5$

401. (b)

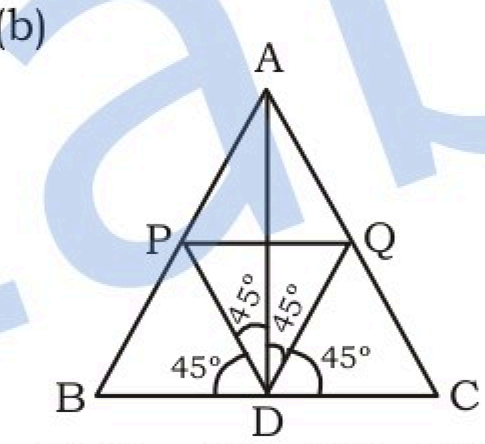


$\angle BCD = 120°$

$\angle ABD = 30°$

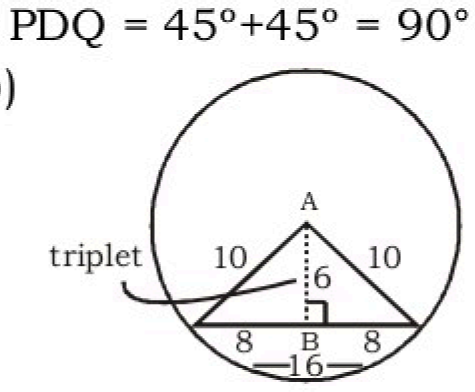
$\angle ADB = 90°$

402. (b)



$\angle PDQ = 45° + 45° = 90°$

403. (b)



In $\triangle$ ABC

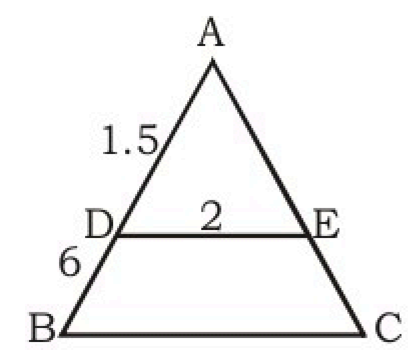
$AB^2 = AC^2 - BC^2$

$= 10^2 - 8^2$

$= 100 - 64 = 36$

AB = 6 cm

404. (c)



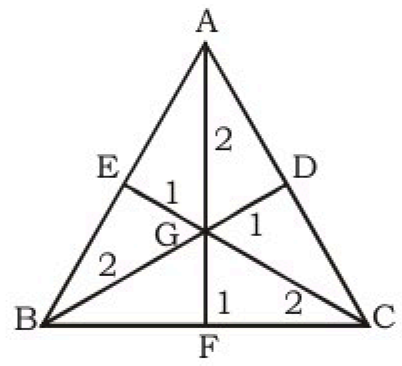
$\Delta ADE \backsimeq \Delta ABC$

$\frac{AD}{AB} = \frac{DE}{BC}$

$\frac{1.5}{7.5} = \frac{2}{BC}$

BC = 10 cm

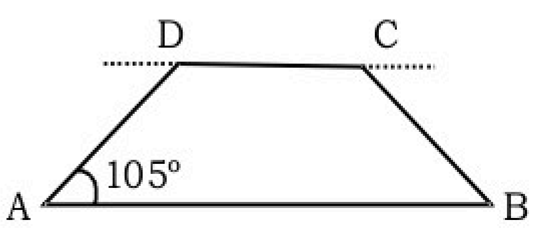
405. (b)



G = Centroid (centroid divides the median in 2 : 1)

AG : GF = 2 : 1

406. (c)



From fig. $\angle A + \angle D = 180$

$\angle D = 180 - 105 = 75$

$\angle D = 75$

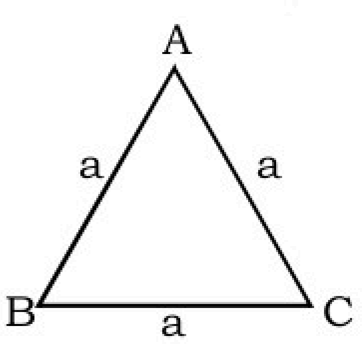
$\angle B = \angle D = 75$

(cyclic trapezium)

$\angle A = \angle C = 105$

(cyclic trapezium)

407. (c)

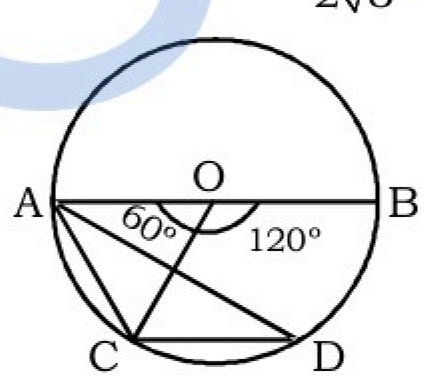


circum radius (R) = $\frac{a}{\sqrt{3}}$

In radius = $\frac{a}{2\sqrt{3}}$

Required ratio = $\frac{\frac{a}{\sqrt{3}}}{\frac{a}{2\sqrt{3}}} = 2 : 1$

408. (b)



From fig $\angle BOC = 120°$

$\therefore$ AOC = 180° – 120° = 60°

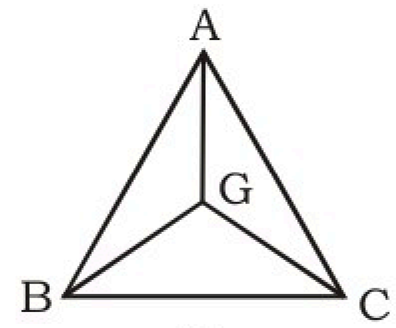
So, $\angle ADC = \frac{1}{2} \angle AOC$

(Angle made on circumference is half of the angle made on centre)

$= \frac{1}{2} \times 60°$

$\angle ADC = 30°$

409. (b)



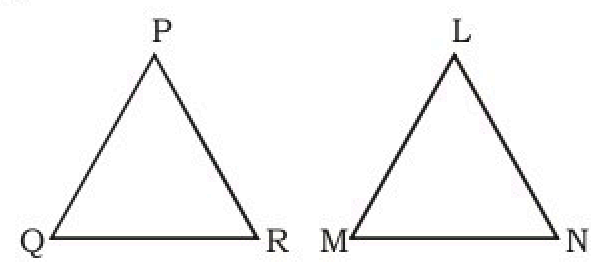
G is centroid

Area of $\triangle BGC = \frac{1}{3}$ area of $\triangle ABC$

$= \frac{1}{3} \times 72 = 24$ sq units.

410. (a) In acute angled triangle orthocentre is always inside the triangle

411. (d)



$\frac{PQ}{LM} = \frac{QR}{MN} = \frac{PR}{LN}$

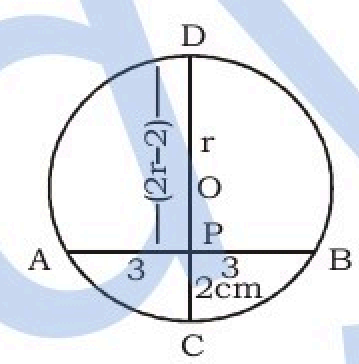
($\triangle$ PQR and $\triangle$ LMN are similar)

$\frac{PQ}{LM} = \frac{QR}{MN}$

$\frac{1}{3} = \frac{QR}{9}$

QR = 3 cm.

412. (b)



From the fig.

AP × PB = PD × PC

3 × 3 = (2r – 2) × 2

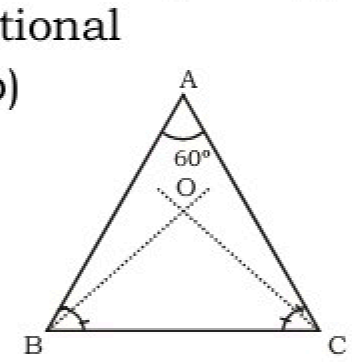
13 = 4r – 4

4r = 13

diameter 2r = 6.5 cm

413. (c) Two triangles are similar if their correspoding sides are proportional

414. (b)

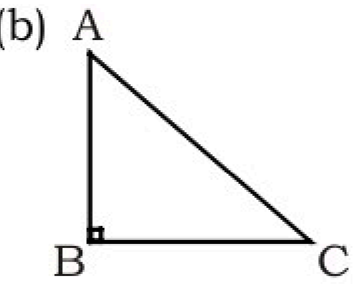


$\angle A = 60°$

$\angle BOC = 90° + \frac{\angle A}{2}$

$\Rightarrow 90° + \frac{60°}{2} \Rightarrow 120°$

415. (b)



$\angle A + \angle B + \angle C = 180°$ [$\angle B = 90°$]

$\angle A + \angle C = 180° - 90°$

$\angle A + \angle C = 90°$.....(i)

$\angle A - \angle C = 8°$ ....(ii) (given)

$2\angle A = 98°$

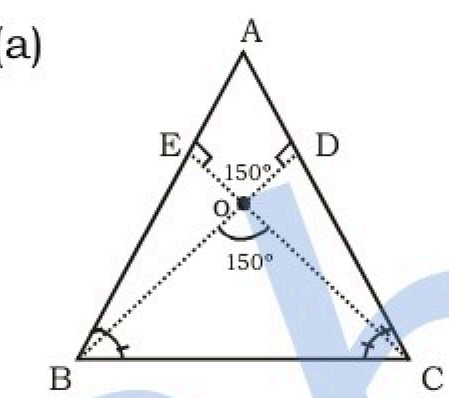
$\angle A = 49°$

$\angle A$'s value putting in equation (i)

$49° + \angle C = 90°$

$\angle C = 90° - 49° = 41°$

416. (a)



$\angle D + \angle E = 180°$

$\angle A + \angle O = 180°$

$\angle A + \angle BOC = 180°$

$\angle A = 30°$

417. (d) For triangle's side must be

$5 + x > 9$

OR

$9 - 5 < x$

Only option (d) Satisfy So,

$x = 6$

418. (a) Let angle = $x, 2x, 3x$

$x + 2x + 3x = 180$

($\because$ Sum of internal angle of a $\triangle$)

$6x = 180°$

$x = 30°$

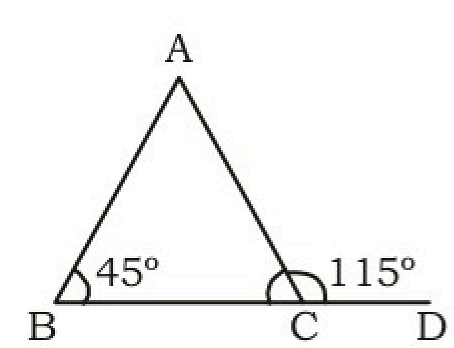
So, angle = 30,60,90

Smallest side of $\triangle$

= 1 Unit = 10 cm

Largest side of $\triangle$ = 2 units = 20 cm

419. (a)



$\Rightarrow \angle ACB = 180 - 115°$

= 65° (linear angle)

$\because \angle A + \angle B + \angle ACB = 180$

$\Rightarrow \angle A + 45° + 65° = 180°$

$\angle A = 180 - 110$

$= \angle A = 70$

$\Rightarrow \angle A = 70$

Angles are 65° and 70°

420. (b) $\angle A + \angle B = 75°$ .....(i)

$\angle B + \angle C = 140°$ ....(ii)

(we know)

$\angle A + \angle B + \angle C = 180$ . . (iii)

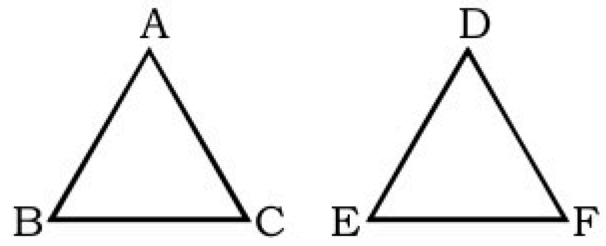
from equ (i) & (iii)

$\angle C = 105°$ .....(iv)

from eq (ii) & eq (iv)

$\angle B = 35°$

421. (b) $\because \triangle ABC \cong \triangle DEF$

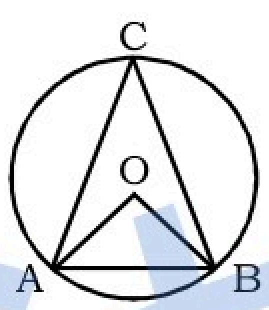


$\therefore \frac{AB}{DE} = \frac{BC}{EF} = \frac{\sqrt{9}}{\sqrt{16}}$

$= \frac{2.1}{EF} = \frac{3}{4}$

EF = 2.8 cm

422. (d) $\because$ OA = AB = OB (given)



$\therefore \triangle AOB$ is equilateral D

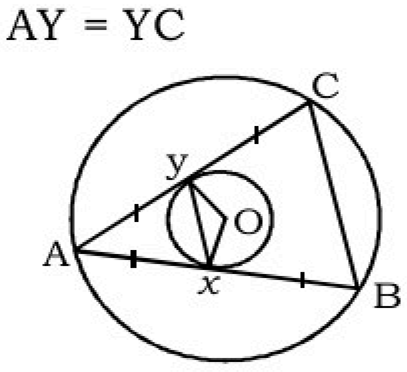
So, $\angle AOB = \angle OAB = \angle ABO = 60°$

$\because \angle ACB = \frac{1}{2} \angle AOB$

$= \frac{1}{2} \times 60° = 30°$

423. (b) Draw $\perp$ OY on AC

So, AY = YC



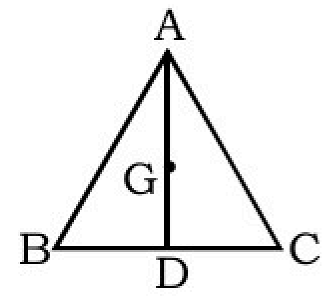
AX = BX [$\because OX \perp AB$]

$\because \triangle AYX \cong ABC$

$\frac{AY}{AC} = \frac{XY}{BC}$

$\frac{AY}{2AY} = \frac{XY}{BC} = XY = \frac{1}{2} BC$

424. (c)

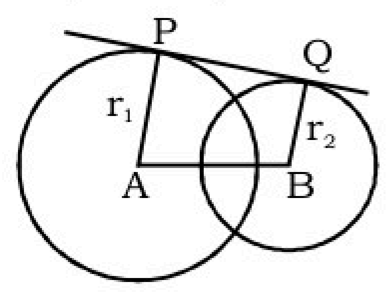


Given, perimeter = 3a = 24

$\therefore$ a = 8

$AG = \frac{a}{\sqrt{3}} = \frac{8}{\sqrt{3}}$ cm

425. (d)



r_1 = 11 cm

r_2 = 6 cm

length of common tangent

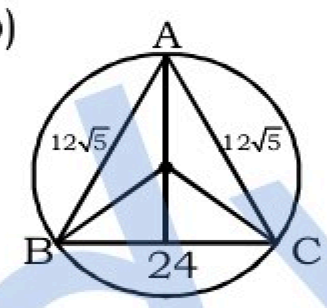
$PQ = \sqrt{AB^2(r_1 - r_2)2}$

$= \sqrt{169 - (11-6)^2}$

$PQ = \sqrt{144}$ = 12 cm

PQ² 12cm

426. (b)



$R_2 = \frac{abc}{4\Delta}$

$\Delta = \sqrt{S(s-a)(s-b)(s-c)}$

$= \sqrt{12(\sqrt{5}+1)(12)\times 12 \times 12(\sqrt{5}-1)}$

where –a = $12\sqrt{5}$, b = $12\sqrt{5}$

& C = 24

$S = \frac{a+b+c}{2} = \frac{24\sqrt{5}+24}{2}$

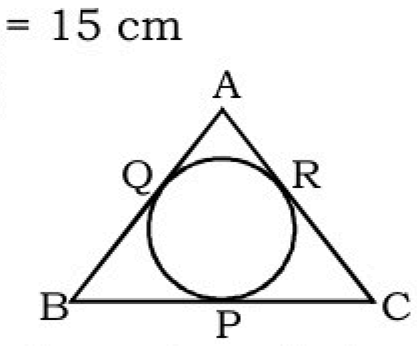
$S = 12\left(\sqrt{5}+1\right)$

$R_2 = \frac{12\sqrt{5} \times 12\sqrt{5} \times 24}{4 \times 12 \times 12 \times 2}$

$= \frac{30}{2}$ =15 cm

R_2 = 15 cm

427. (a)



here given that = AB = AC

AQ + BQ = AR + RC

we know that

BQ = PB & PC = RC

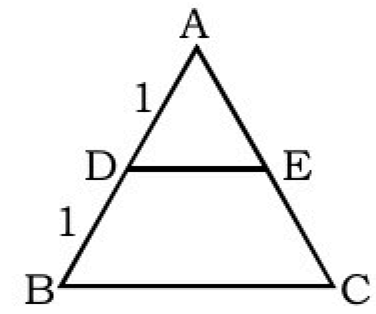
AQ + PB = AR + PC

also AQ = AR

AR + PB = AR + PC

PB = PC

428. (d)



given that AB = AC

Let, AB = 2cm. then AD = 1 & DB = 1

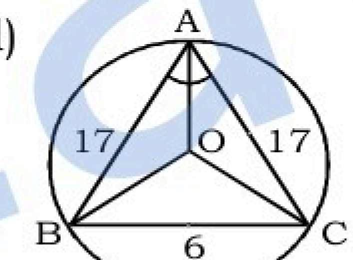
$\because \triangle ADE$ & $\triangle ABC$ are similar triangle

$\frac{\text{Ar of } \Delta ADE}{\text{Ar of } \Delta ABC} = \frac{AD^2}{AB^2} = \frac{1^2}{2^2} = \frac{1}{4}$

area of $\triangle$ ABC = 4 then area of $\square$ BCED = 4 – 1 = 3

$\text{Ratio} = \frac{ar\Delta ADE}{ar\square BCED} = \frac{1}{3}$

429. (d)



a = b 17 cm

c = 6 cm

$R = \frac{abc}{4\Delta}$

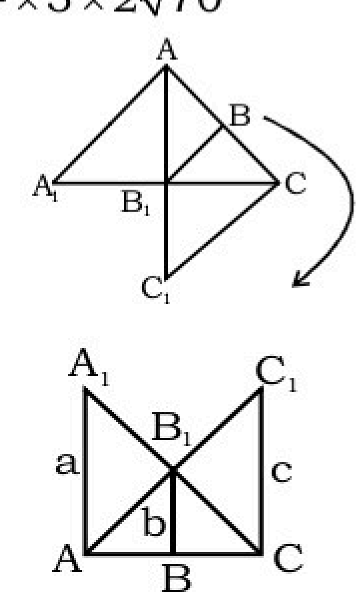
$= \frac{17 \times 17 \times 6}{4 \times \sqrt{S(s-a)(s-b)(s-c)}}$

$S = \frac{17+17+6}{2}$ = 20 cm

$R = \frac{17 \times 17 \times 6}{4\sqrt{20(3)(3)(3) \times 14}}$

$R = \frac{17 \times 17 \times 6}{4 \times 3 \times 2\sqrt{70}}$ = 3.125 cm

430. (b)



In $\triangle AA_1C \cong \triangle BB_1C$

$$\frac{BB_1}{AA_1} = \frac{BC}{AC} \quad ....(i)$$

$\triangle AC_1C \cong \triangle BB_1A$

$$\frac{BB_1}{CC_1} = \frac{AB}{AC} \quad ....(ii)$$

Adding eq (i) and (ii)

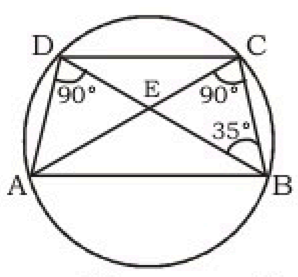
$$\frac{BB_1}{AA_1} + \frac{BB_1}{CC_1} = \frac{BC}{AC} + \frac{AB}{AC}$$

$$BB_1\left[\frac{1}{AA_1} + \frac{1}{CC_1}\right] = \frac{BC+AB}{AC}$$

$$\frac{1}{AA_1} + \frac{1}{CC_1} = \frac{AC}{AC} \times \frac{1}{BB_1}$$

or $\frac{1}{BB_1} = \frac{1}{AA_1} + \frac{1}{CC_1}$

431. (c)



According to figure $\triangle ABD$ is right $\angle$triangle because subscribe in half circle.

$\therefore \angle ADB = 90°$

Same as $\angle ACB = 90°$

Now in $\triangle ECB$

$\angle ECB + \angle EBC + \angle BEC = 180°$

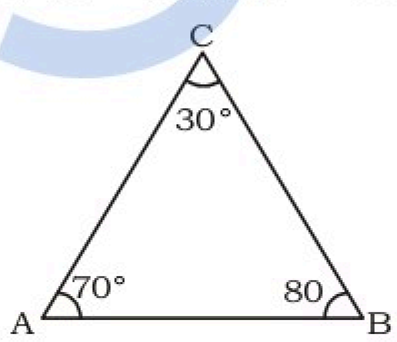
$90° + 35 = EBC = 180$

$\angle BEC = 180 - 125$

$\boxed{\angle BEC = 55°}$

$\angle BEC = \angle AED = 55°$

432. (b)

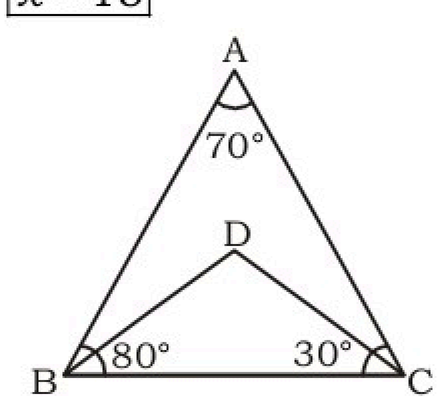


$\angle C = 180 - (\angle A + \angle B)$

$\angle C = 180 - 150$

$2x = 30$

$\boxed{x = 15}$



$\angle BDC = 90° + \frac{1}{2}\angle A$

$= 90° + \frac{1}{2} \times 70°$

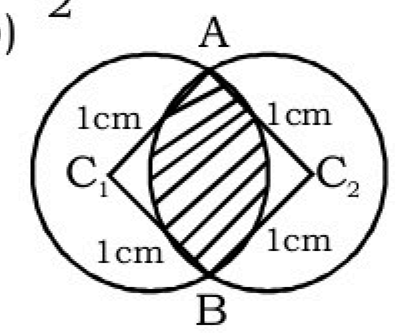
$= 90° + 35° = 125°$

So value of x and y are = 15°, 125°

433. (c) Median of right angle = $\frac{EF}{2}$

$= \frac{12}{2} = 6$ cm.

434. (b)



Now, Area of arc AC_1B

$= \pi r^2 . \frac{90}{360}$

$= \frac{\pi}{4}(1)^2 = \frac{\pi}{4}$

and area of arc

$AC_2B = \frac{\pi}{4}$

area of square = $(\text{side})^2 = 1$

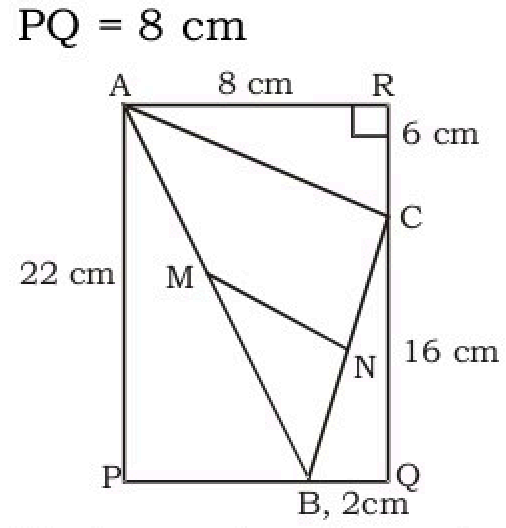
area of common portion

= area of arc $(AC_1B + AC_2B)$ –

Area of square = $\frac{\pi}{4} + \frac{\pi}{4} - 1$

$\frac{\pi}{2} - 1$ sq.m

435. (b) Given that AP = 22 cm and PQ = 8 cm



Made a triangle such that B, is on side PQ and BQ = 2 cm

And C is on RQ such that QC = 16 cm

Because all the vertices are on sides of PQRA.

Now, PQRA is a rectangle so all the angle will be of 90°.

$\angle ARQ = 90°$

and RC = RQ – CQ = 22 – 16 cm = 6 cm

In right angle $\triangle ARC$

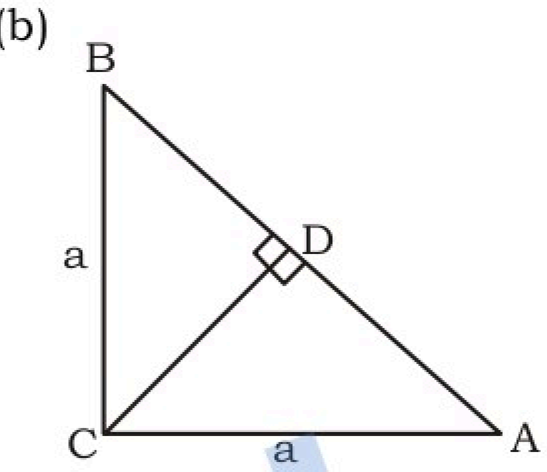
$AC^2 = AR^2 + RC^2 = 8^2 + 6^2$

$\boxed{AC = 10}$

Now in $\triangle ABC$ AC is 10 cm and M, N are the mid point of $\triangle ABC$

So, $MN = \frac{10}{2} = 5$ cm.

436. (b)



$\triangle ABC$ is a right angle triangle.

In which $\angle C = 90°$ And D is a point on AB such that D is perpendicular on AB.

Let AC = BC = a

$\therefore AB^2 = AC^2 + BC^2 = a^2 + a^2$

$\boxed{AB = a\sqrt{2}}$

$\therefore BD = AD = \frac{a\sqrt{2}}{2} = \frac{a}{\sqrt{2}}$

Now In $\triangle ACD$

$= AC^2 = CD^2 + AD^2$

$a^2 = CD^2 + \frac{a^2}{2}$

$a^2 - \frac{a^2}{2} = CD^2$

$\boxed{\frac{a^2}{2} = CD^2}$

$CD^2 = \frac{a^2}{2}$

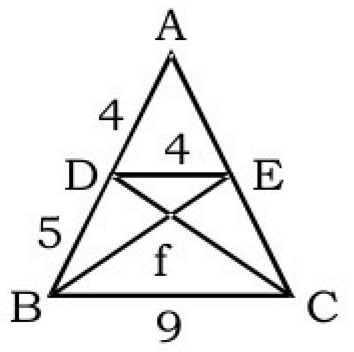
$2CD^2 = a^2$

and $AD^2 + BD^2 = \left(\frac{a}{\sqrt{2}}\right)^2 + \left(\frac{a}{\sqrt{2}}\right)^2$

$= \frac{a}{\sqrt{2}} + \frac{a}{\sqrt{2}} = a^2$

$\therefore \boxed{2CD^2 = AD^2 + BD^2}$

437. (b)



$\triangle ADE \sim \triangle ABC$

$\therefore \angle D = \angle B$

& $\angle E = \angle C$

$\angle A$ is common.

So,

$$\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} = \frac{4}{9}$$

Now, In $\triangle DEF$ and $\triangle BFC$

$\angle DEF = \angle BFC$

$\angle D = \angle C$ and

$\angle B = \angle E$

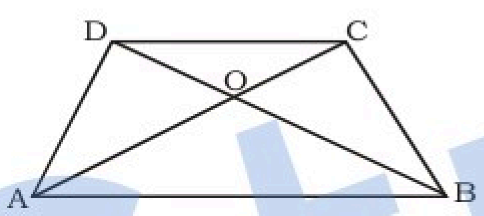
So, $\triangle DEA \sim \triangle BFC$

In similar triangles ratio of areas is equal to the ratio of square of corresponding sides.

$$\text{area of } \frac{\text{area of } \triangle DEF}{\text{area of } \triangle BFC} = \frac{DE^2}{BC^2}$$

$$= \frac{4^2}{9^2} = = \frac{16}{81}$$

438. (a)



In $\triangle DOC$ & AOB

$\angle A = \angle C$ (alternate angle)

$\angle B = \angle D$

$\angle AOB = \angle COD$

So,

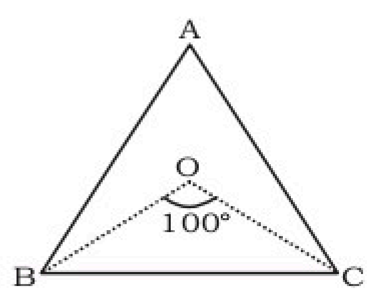
$\triangle DOC \sim AOB$

In similar triangle ratio of area is equal to the ratio of square of corrosponding sides $\frac{ar\triangle AOB}{ar\triangle COD}$

$$= \frac{AB^2}{CD^2} = \frac{2^2}{1^2}$$

$$= \frac{4}{1} = 4 : 1$$

439. (a)

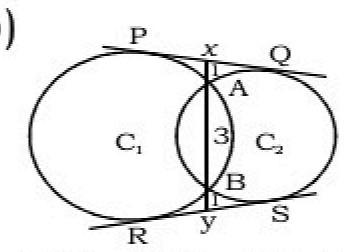


O is orthocentre angle at orthocentre = 180 – opposite angle

$100 = 180 - \angle A$

$\angle A = 80°$

440. (b)



XY = XA+AB+BY

$\because$ AX = BY

XY = 2AX + AB

5 = 2AX + 3

AX = 1 cm

$PX^2 = AX \times XB = 1 \times 4$

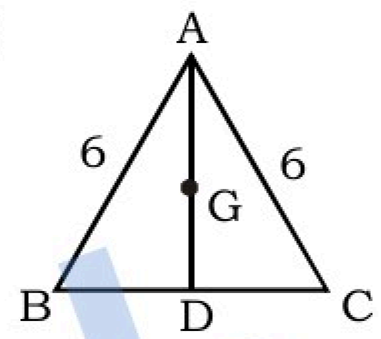
$PX = \sqrt{4} = 2$cm

$\therefore C_2 = OX^2 = XA \times XB = 1 \times 4$

$OX^2 = \sqrt{4} = 2$

So, PQ = PX + XQ = 2 + 2 = 4 cm

441. (c)



In Equilateral triangle

AG : GD = 2 : 1

$AD = \frac{\sqrt{3}}{2}a$

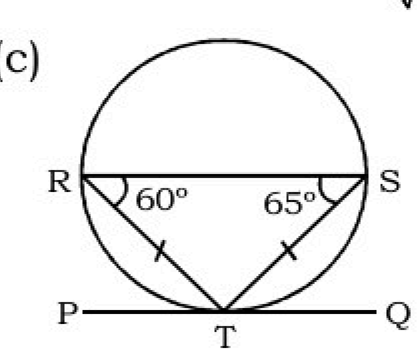
$= \frac{\sqrt{3}}{2} \times 6 = 3\sqrt{3}$

$3 \rightarrow 3\sqrt{3}$

$1 \rightarrow \sqrt{3}$

AG = 2 unit = $2\sqrt{3}$ cm

442. (c)



$\because$ RT = TS

$\angle TRS = \angle RST$

$\because \angle RTP = \angle RST$ (property) of circle

$\angle RTP = 65°$

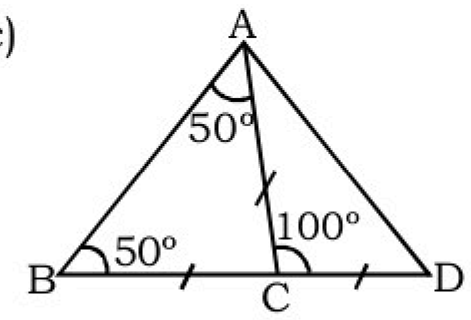
$\angle RTS = 180 - (65° + 65°)$

= 50°

$\angle PTS = 65° + 50°$

= 115°

443. (c)



In $\triangle ABC$

$\angle B = \angle A = 50°$

$\angle ACD = 50° + 50° = 100$

$\angle ACD$ is the external angle or $\triangle ABC$

$\angle ACD + \angle CAD + \angle ADC = 180°$

$\angle CAD = \angle ADC$

$\because$ AC = CD

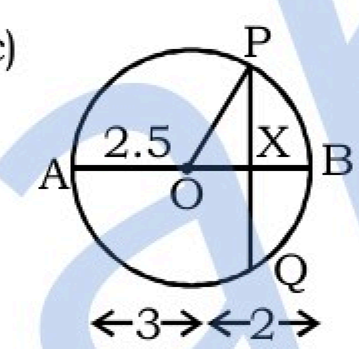
$2\angle CAD = 180 - 100$

$\angle CAD = 40°$

$\angle BAD = 50° + 40°$

= 90°

444. (c)



AB = 5 unit

AO = 2.5

OP = 2.5

OX = OB – BX

= 2.5 – 2

= 0.5

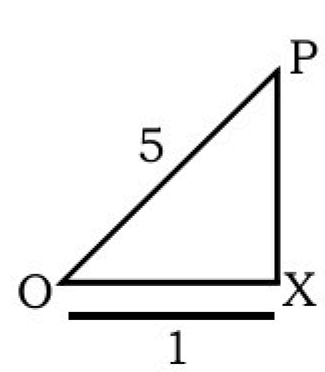
OP = 2.5 unit

$2.5 \rightarrow 5$

$1 \rightarrow 2$

$.5 \rightarrow .5 \times 2 = (1)$

In $\triangle OPX$



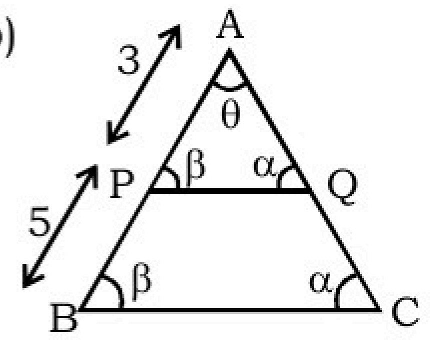
$PX = \sqrt{25-1} = \sqrt{24}$

$= 2\sqrt{6}$

PQ = 2PX

$= 2 \times 2\sqrt{6} = 4\sqrt{6}$ cm

445. (b)



$\because$ PQ | | BC

So $\angle$AQP = $\angle$ACB = α

and

$\angle$APQ = $\angle$ABC = β

So, ΔABC and ΔAPQ

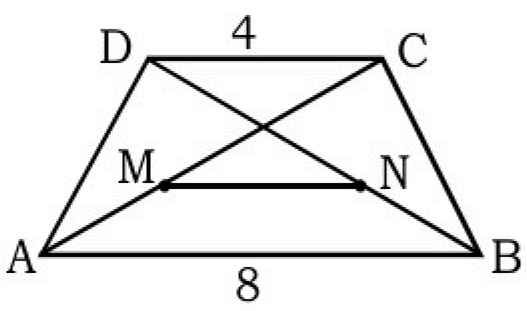
$$\frac{AP}{AB} = \frac{PQ}{BC}$$

$$\frac{3}{8} = \frac{PQ}{BC}$$

$$\frac{3}{8} = \frac{18}{BC}$$

BC = 48 cm

446. (d)



mid point M : N

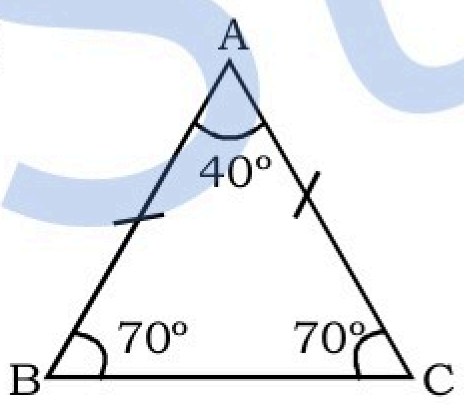
and MN is given by

= 8

$$= \frac{AB - CD}{2}$$

$$= \frac{8-4}{2} = 2 \text{ cm}$$

447. (a)



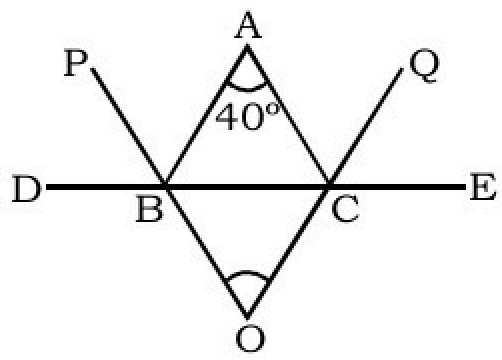
AB = AC

$\therefore$ $\angle$B = $\angle$C

$$\angle B = \frac{180° - 40°}{2}$$

$\angle$B = 70°

$\angle$B = $\angle$C = 70°



$$\angle BOC = 90° - \frac{\angle A}{2}$$

= 90° – 20°

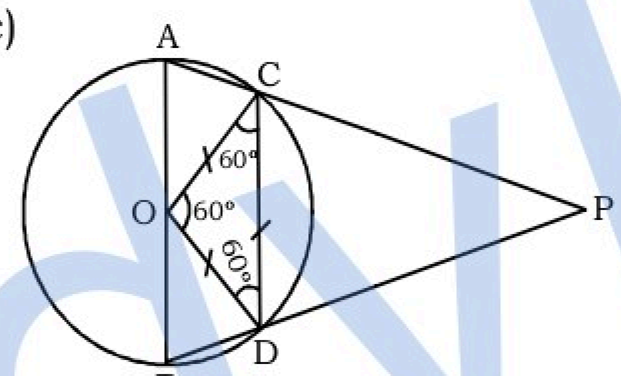
= 70°

448. (a) $R = \frac{a}{\sqrt{3}}$

$$R = \frac{6}{\sqrt{3}} = 2\sqrt{3}$$

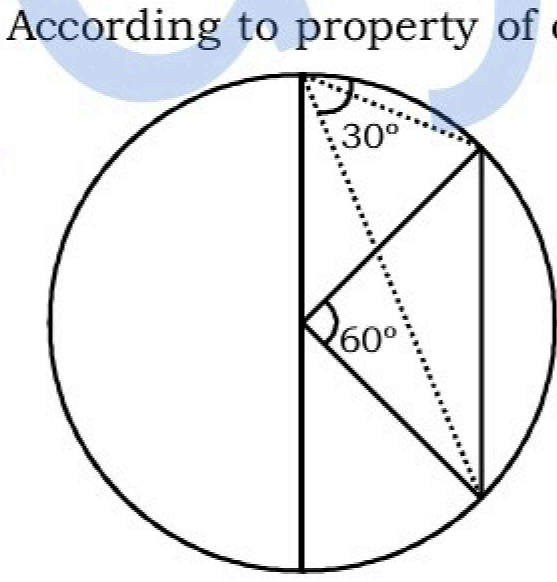
$= 2\sqrt{3}$

449. (c)



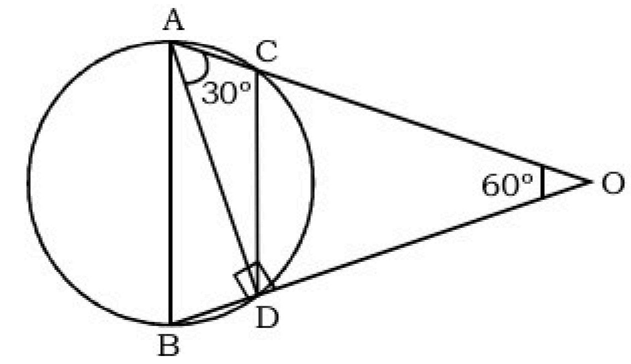
$\because$ OC = CD = radius

According to property of circle



Same arc angle

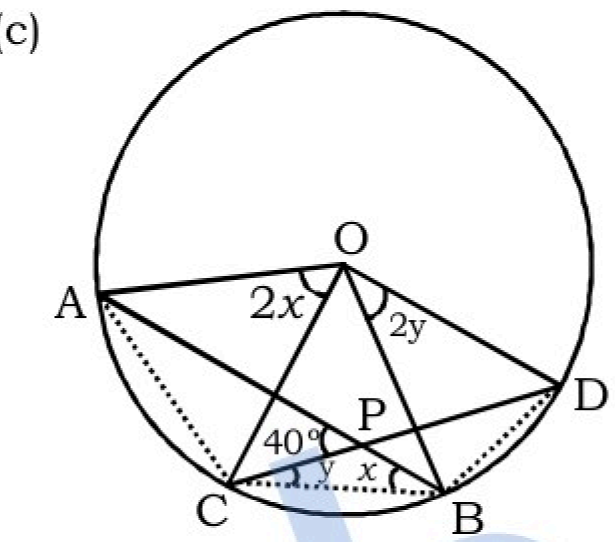
Make line AD

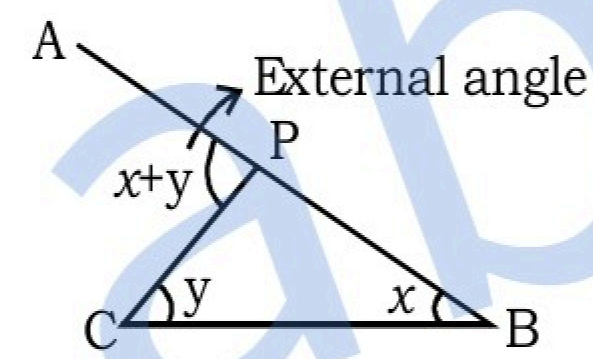


Angle BDA =90 becouse of semi-circle property

$\angle$P = 90° – 30° = 60°

450. (c)





x+y = 40

2x + 2y = 80°

$\angle$AOC + $\angle$BOD = 80°