18 Geometry

CHAPTER -18B

For SSC CHSL Exam

1. One of the angles of a triangle is 108°, and the other two angles are equal. What is the measure of each of these equal angles?

SSC CHSL 10/06/2022 (Shift-2)

(a) 36° (b) 72° (c) 78° (d) 39°

2. The ratio in which a transverse common tangent drawn to two circles with radii 4 cm and 6 cm, respectively, divides the line joining their centres is:

SSC CHSL 09/06/2022 (Shift-3)

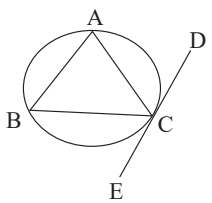
(a) 2:3 (b) 1:1 (c) 1:2 (d) 3:4

3. In a circle, AB and CD are two diameters which are perpendicular to each other. Find the length of chord AC.

SSC CHSL 09/06/2022 (Shift-2)

(a) $\sqrt{2}$ CD (b) $\frac{AB}{\sqrt{2}}$ (c) $\frac{CD}{2}$ (d) 2AB

4. In the following figure, ∠ABC is an inscribed *triangle* as shown and DE is a tangent to the circle at C. If m∠ACD = 65° and m ∠ACB = 35°, find the measure of m ∠BAC.



SSC CHSL 09/06/2022 (Shift-1)

(a) 30° (b) 75° (c) 60° (d) 65°

5. If two circles of radii 28 cm and 18 cm touch each other externally, then the length of a common tangent (in cm) is _____. [Give your answer correct to 2 decimal places.]

SSC CHSL 08/06/2022 (Shift-3)

(a) 40.90 (b) 42.00 (c) 44.90 (d) 44.12

6. From a point P that is at a distance of 15cm from centre O of a circle of radius 9 cm, in the same plane, a pair of tangents PQ and PR is drawn to the circle. The area of quadrilateral PQOR (in cm²) is :

SSC CHSL 19/04/2021 (Shift-3)

(a) 114 (b) 108 (c) 118 (d) 106

7. In a right angled triangle ABC, if ∠ABC = 90°, AB = 6cm, BC = 8cm, and BD is perpendicular to AC, then AD : DC.

SSC CHSL 19/04/2021 (Shift-3)

(a) 7 : 16 (b) 8:15 (c) 9:14 (d) 9:16

8. Find the radius of the circles

$x^2 + y^2 - 4x + 6y = 12$.

SSC CHSL 08/06/2022 (Shift-2)

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

9. If two supplementary angles differ by 74°, then one of the angles is:

SSC CHSL 08/06/2022 (Shift-1)

(a) 65° (b) 55° (c) 43° (d) 53°

10. An arc on a circle that is 18 cm long, subtends a 28.8 ° angle at the centre. What is the circumference of the circle (in cm)?

SSC CHSL 07/06/2022 (Shift-3)

(a) 180 (b) 216 (c) 225 (d) 240

11. The area of two similar triangles XYZ and ABC are 361 cm^2 and 225 cm^2, respectively. If the longest side of the larger Δ XYZ be 38 cm, then what is the length (in cm) of the longest side of the smaller Δ ABC?

SSC CHSL 07/06/2022 (Shift-2)

(a) 35 (b) 28 (c) 32 (d) 30

12. Chords AB and CD of a circle are produced to meet at the point P, outside the circle, and AD is the diameter of the circle. If ∠DAP = 36° and ∠APC = 30°, then what will be the measure of ∠CBD?

SSC CHSL 19/04/2021 (Shift-2)

(a) 34° (b) 26° (c) 24° (d) 16°

13. PQRS is a cyclic quadrilateral with QR as the diameter of the circle. If ∠SQR = 24° then what will be the measure of ∠QPS

SSC CHSL 19/04/2021 (Shift-2)

(a) 114° (b) 126° (c) 104° (d) 116°

14. In Δ*PQR* , ∠*PQR* = 135°, PQ = $8\sqrt{2}$ cm and PR = 17 What is the length (in cm) of QR?

SSC CHSL 19/04/2021 (Shift-2)

(a) 7 (b) 10 (c) 8 (d) 9

15. The perimeter of Δ*ABC* and Δ*DEF* are 39.6 cm and 26.4 cm, respectively, and Δ*ABC* ~ Δ*DEF*. What is the ratio of the areas of Δ*ABC* and Δ*DEF*?

SSC CHSL 19/04/2021 (Shift-2)

(a) 3:2 (b) 9:4 (c) 16:9 (d) 9:2

16. In Δ*ABC*, D and E are points on sides AB and BC, respectively, such that BD : DA = 1 : 2 and CE : EB = 1 : 4. If DC and AE intersect at F, then FD : FC is equal to:

SSC CHSL 19/04/2021 (Shift-1)

(a) 3:2 (b) 5:2 (c) 8:3 (d) 4:1

17. A and B are two points on a circle with centre O. C is a point on the minor arc of the circle between points A and B. The tangents to the circle at A and B meet each other at a point D. If $\angle ADB = 25°$, then $\angle ACB$ (in degrees) is equal to:

SSC CHSL 16/04/2021 (Shift-2)

(a) 105 (b) 100.5 (c) 102.5 (d) 100

18. The side BC of triangle ABC is produced to D. The bisectors of $\angle ABC$ and $\angle ACD$ meet at E. If AB = AC and $\angle BEC = 35°$, then the measure of $\angle ABC$ will be:

SSC CHSL 16/04/2021 (Shift-2)

(a) 75° (b) 55° (c) 35° (d) 45°

19. In ΔABC, $\angle B = 90°$, AD and CE are the medians drawn from A and C respectively. If AC = 10cm and AD = $\sqrt{55}$ *cm*, then the length of CE is:

SSC CHSL 16/04/2021 (Shift-2)

(a) $2\sqrt{15}$ cm (b) $\sqrt{70}$ cm (c) $\sqrt{66}$ cm (d) $5\sqrt{3}$ cm

20. The sides AB and AC of a ΔABC are produced up to points D and E. The bisectors of the exterior angles so formed, intersect each other at point I. If $\angle ACB = 66°$ and $\angle ABC = 44°$, then what is the measure (in degrees) of $\angle BIC$?

SSC CHSL 15/04/2021 (Shift-2)

(a) 52 (b) 50 (c) 48 (d) 55

21. AB is a diameter of the circle with centre D. The tangent at the point C on the circle meets AB produced at Q. If $\angle BAC = 34°$ then the measure of $\angle CQA$ (in degrees) will be:

SSC CHSL 15/04/2021 (Shift-1)

(a) 26° (b) 36° (c) 22° (d) 24°

22. $\Delta ABC \sim \Delta EDF$, Area of ABC : 2 Area of DEF = 49 :4. If AB, AC, BC are respectively, 10cm, 14cm, 21cm, then what is the length (in cm) of EF?

SSC CHSL 15/04/2021 (Shift-1)

(a) 4.5 (b) 6 (c) 3.5 (d) 4

23. AB is a diameter of a circle with centre O. If C is any point on the circle such that $\angle BAC = 42°$, then find the measure of $\angle BOC$.

SSC CHSL 15/04/2021 (Shift-1)

(a) 60° (b) 63° (c) 42° (d) 84°

24. $\Delta ABC \sim \Delta PQR$.The perimeters of ΔABC and ΔPQR are 72 cm and 43.2 cm, respectively. What is the ratio of the areas of ΔABC to the area of ΔPQR?

SSC CHSL 15/04/2021 (Shift-1)

(a) 25:9 (b) 36:25 (c) 16:9 (d) 9:4

25. A circle touches all four sides of a quadrilateral PQRS. If PQ = 11cm QR = 12cm and PS = 8cm then what is the length of RS?

SSC CHSL 13/04/2021 (Shift-3)

(a) 9 (b) 7.3 (c) 7 (d) 15

26. P, Q and R are three points on the circumference of a circle such that QR is a diameter and PQ = PR If the radius of the circle is 7 cm, then the length of PQ (in cm) is:

SSC CHSL 13/04/2021 (Shift-3)

(a) $14\sqrt{2}$ (b) 7 (c) $7\,7\sqrt{3}$ (d) $7\sqrt{2}$

27. The side BC of a triangle ABC is extended to a point D. If $\angle ACD = 117°$ and $\angle ABC = \frac{5}{8}\angle BAC$ then what is the measure of $\angle ABC$.

SSC CHSL 13/04/2021 (Shift-3)

(a) 45° (b) 72° (c) 36° (d) 54°

28. Two sides of a triangle are 12.8 m and 9.6 m. If the height of the triangle is 12 m, corresponding to 9.6 m, then what is its height (in m) corresponding to 12.8 m?

SSC CHSL 13/04/2021 (Shift-2)

(a) 12 (b) 9 (c) 10 (d) 8

29. In ΔABC, $\angle B = 90°$, AB = 8 cm, BC = 15 cm. D is a point on BC such that AD bisects $\angle A$. The length of BD (in cm) is:

SSC CHSL 13/04/2021 (Shift-2)

(a) 4.5 (b) 4.8 (c) 4.2 (d) 3.6

30. ABCD is a cyclic quadrilateral with AB as a diameter of the circle. If $\angle ADC = 118°$ then the measure (in degrees) of $\angle BAC$?

SSC CHSL 13/04/2021 (Shift-2)

(a) 32 (b) 38 (c) 22 (d) 28

31. AB and CD are two chords of a circle which intersect at E inside the circle. If $\angle BEC = 125°$ and $\angle EBD = 28°$, then what is the measure of $\angle BAC$?

SSC CHSL 13/04/2021 (Shift-1)

(a) 55° (b) 87° (c) 56° (d) 97°

32. ΔPQR is inscribed inside a circle with center O. Proceeding from PO, meets QR at point U and meets circle at point S and is PT ⊥ QR, where point T lies between point Q and point U. If $\angle Q = 70°$ and $\angle R = 55°$ then find the measure of $\angle TPS$.

SSC CHSL 13/04/2021 (Shift-1)

(a) 25 (b) 30 (c) 15 (d) 20

33. In ΔABC, DE || AB, where D and E are points on sides AC and BC respectively. F is a point between C and D such that EF || BD. If AD = 15 cm, DC = 10 cm, then the length of CF is:

SSC CHSL 13/04/2021 (Shift-1)

(a) 3cm (b) 7.5cm (c) 5cm (d) 4cm

34. Two circles with centre O and P and radii 17 cm and 10 cm respectively, intersect each other at A and B. The length of the common chord AB is 16 cm. What is the perimeter of the triangle OAP? (in cm)

SSC CHSL 12/08/2021 (Shift-3)

(a) 33 (b) 25 (c) 48 (d) 40

35. Two equal circles of radius 8 cm intersect each other such that each passes through the centre of the other. The length (in cm) of the common chord is:

SSC CHSL 12/08/2021 (Shift-3)

(a) 8 (b) $4\sqrt{3}$ (c) $8\sqrt{3}$ (d) $8\sqrt{2}$

36. In ΔABC, AC = BC, and the length of the base AB is 10cm. If CG = 8cm , where G is the centroid, then what is the length of AC (in cm)?

SSC CHSL 12/08/2021 (Shift-3)

(a) 13 (b) 15 (c) $\sqrt{91}$ (d) 12

37. ΔABC is drawn in a circle such that AC = BC and $\angle BAC = 65°$. From points B and C two tangents are drawn which intersect at point P. What is the measure of $\angle BPC$?

SSC CHSL 12/08/2021 (Shift-1)

(a) 52.5° (b) 50° (c) 55° (d) 32.5°

38. O is the centre of a circle of radius 9 cm. M is a point outside the circle and MN is a tangent to the circle.
What is the length (in cm) of OM if the length MN is 12 cm?

SSC CHSL 12/08/2021 (Shift-1)

(a) 17 (b) 12 (c) 15 (d) 21

39. The side QR of a triangle PQR is extended to a point S. If $\angle PRS = 104°$ and $\angle PQR = \frac{3}{5}\angle QPR$, then the value of $\angle QPR$ is:

SSC CHSL 12/08/2021 (Shift-1)

(a) 65° (b) 55° (c) 45° (d) 58°

40. Chords AB and CD of a circle meet at point P (outside the circle), when produced. If AB = 9cm, PB = $\frac{1}{3}$ *AB* and CD = 5 cm then the length of PD:

SSC CHSL 12/08/2021 (Shift-1)

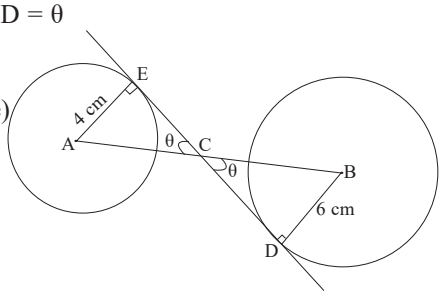
(a) 7 cm (b) 6 cm (c) 5 cm (d) 4 cm

SOLUTIONS

1. (a) we know that
Sum of angles in a triangle = 180°
Let two equal angle (each) be *x*
$x + x + 108° = 180°$
$\Rightarrow 2x = 72°$
$\therefore x = 36°$

2. (a) According to question
$\angle AEC = \angle BDC = 90°$
$\angle ACE = \angle BCD = \theta$

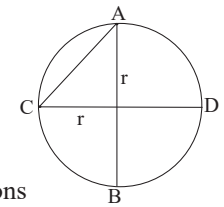
(vertically opposite angle)



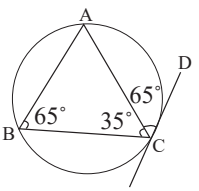
$\therefore \Delta EAC \sim \Delta DBC$

$$\frac{AC}{BC} = \frac{AE}{DB} = \frac{4}{6} = \frac{2}{3} = 2:3$$

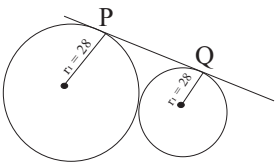
3. (b) According to the question ,
By Pythagoras theorem
$AC = \sqrt{r^2 + r^2}$
$AC = \sqrt{2r^2} = \sqrt{2}\ r$
$AC = \frac{AB}{\sqrt{2}}$



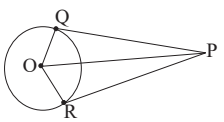
4. (a) According to the questions
Given : $\angle ACD = 65°$
$\angle ACB = 35°$
$\angle ACD = \angle ABC = 65°$
Sum of angles in a triangles = 180°
$\angle BAC = 180° - 65° - 35° = 80°$



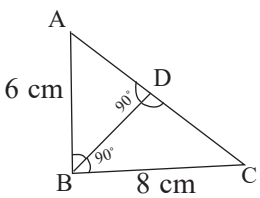
5. (c) According to the question ,
length of a common tangent
$PQ = 2\sqrt{r_1 \times r_2}$
$= 2\sqrt{28 \times 18}$
$= 2 \times 6\sqrt{14}$
$= 12 \times 3.7 = 44.40$



6. (b) According to the question ,
in Δ OPQ,
OP = 15 cm
OR = OQ = 9 cm
PQ = 12 by triplets 9,12,15
Area of quadrilateral = $2 \times \frac{1}{2} \times 12 \times 9 = 108$



7. (d) Given AB = 6 cm
BC = 8 cm
$\angle ABC = 90°$
In right angle tringle ABC
6,8,10 By triplets
AC = 10cm
In Δ BDC and Δ ABC
$\angle B = \angle D = 90°$
$\angle C = \angle C$ (common angle)
BC = BC (common Arm)
$\therefore \Delta BDC \sim \Delta ABC$



$$DC = \frac{BC^2}{AC^2} = \frac{8 \times 8}{10} = 6.4$$

AD = AC – DC = 10 – 6.4 = 3.6
AD : DC = 6 3.6 : 6.4 = 9:16

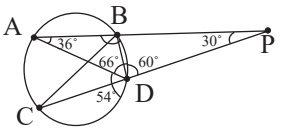
8. (c) According to the question ,
equation of circle = $(x - a)^2 + (y - b)^2 = r^2$
[$\therefore$ a,b are centre point or coordinate of centre]
$(x - 2)^2 + (y + 3)^2 - 13 = 12$
$(x - 2)^2 + (y + 3)^2 = 25$
$\Rightarrow r^2 = 25$
$\therefore r = 5$

9. (d) Let two supplementary angle be A and B
According to question
Sum of supplementary angle = 180°
A + B = 180° —(i)
A + B = 74 — (ii)
Equation (i) + (ii)
2A = 254°
$\Rightarrow \angle A = 127^\circ$
$\therefore \angle B = 180^\circ - 127^\circ = 53^\circ$

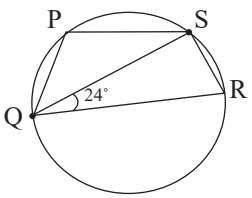
10. (c) According to question
length of arc = $\frac{\pi R\theta}{180}$
$\Rightarrow \frac{\pi R\theta}{180^\circ} = 18$
$\Rightarrow \pi R = \frac{18 \times 180^\circ}{28.8^\circ} =$
$\therefore$ circumference of a circle = $2\pi R$
$= \frac{2 \times 18\ 180^\circ}{28.8^\circ} = 225\text{cm}$

11. (d) Given : Area Δ ABC = 225cm^2
Area Δ XYZ = 316cm^2
and larger side of Δ XYZ = 38
$\frac{\text{Larger side of } \Delta XYZ}{\text{Larger side of } \Delta ABC} = \sqrt{\frac{\text{Area } \Delta \text{ xyz}}{\text{Area } \Delta \text{ ABC}}}$
$= \frac{38}{S\ (\Delta\ ABC)} = \sqrt{\frac{361}{225}} = \frac{19}{15}$
$\Rightarrow$ S (Δ ABC) = 30 cm

12. (c) ATQ ,
$\angle ADC = \angle APC + \angle DAP$
$= 36^\circ + 30^\circ = 66^\circ$
So, $\angle ABC = 66^\circ$
$\angle ABD = 90^\circ$
$\Rightarrow \angle CBD + \angle ABC = 90^\circ$
$\Rightarrow \angle CBD = 90^\circ - 66^\circ = 24^\circ$



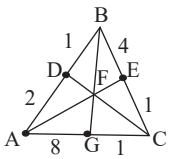
13. (a) Given $\angle SQR = 24^\circ$
$\angle QRS = 90^\circ$(angle inscribed in a semi circle)
$\Rightarrow \angle SQR + \angle QRS + \angle RSQ = 180^\circ$
$\Rightarrow \angle RSQ = 180^\circ - 24^\circ - 90^\circ = 66^\circ$
$\Rightarrow \angle RSQ + \angle QRS = 180^\circ$ (sum of opposite side pair)
$\therefore \angle QPS = 180^\circ - 66^\circ = 114^\circ$



14. (a) Let value of b = x
ATQ ,$\cos 135^\circ = \frac{[x^2 + (8\sqrt{2})^2 - (17)^2]}{2 \times x \times Q\sqrt{2}}$
$\Rightarrow -\frac{1}{\sqrt{2}} = \frac{(x^2 - 161)}{16\sqrt{2}x}$
$\Rightarrow -16x = x^2 - 161$
Factor of – 161
$-23 + 7 = -16$
$\therefore$ QR = 7

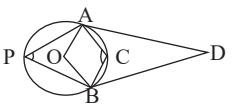
15. (b) ATQ ,
Ratio between area of Δ ABC and Δ DEF
$= \frac{39.6 \times 39.6}{26.4 \times 26.4} = \frac{9}{4}$ or 9 : 4

Sol. 16 : (c) $\frac{BD}{DA} \times \frac{AG}{GC} \times \frac{CE}{BE} = 1$



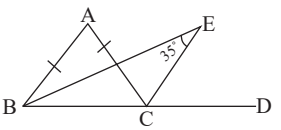
$\frac{AG}{GC} = 1 \times \frac{4}{1} \times \frac{2}{1} = \frac{8}{1}$
$\frac{CF}{FD} = \frac{GC}{AG} + \frac{CE}{BE} = \frac{1}{8} + \frac{1}{4} = \frac{3}{8}$
FD : FC = 8: 3

17. (c)

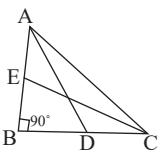


In OADB
$\angle O + \angle A + \angle B + \angle D = 360^\circ$
$\angle O = 360^\circ - 90^\circ - 90^\circ - 25^\circ = 155^\circ$
$\angle O = 2 \angle P$
$\angle P = \frac{\angle O}{2} = \frac{155^\circ}{2} = 77.5^\circ$
PACB is a cyclic quadrilateral
$\angle APB + \angle ACB = 180^\circ$
$\angle ACB = 180 - 77.5 = 102.5^\circ$

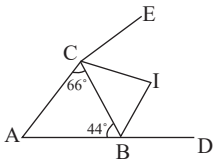
18. (b) $\angle BAC = 2 \angle BEC$
$\angle BAC = 2 \times 35^\circ = 70^\circ$
$\angle B = \angle C$
$\angle A + \angle B + \angle C = 180^\circ$
$2 \angle B = 180^\circ - 70^\circ$
$\angle B = \frac{110^\circ}{2} = 55^\circ$



19. (b) AB = $\sqrt{55}$ cm , AC 10 cm
In Δ ABD
$AD^2 = AB^2 + BD^2$
$AD^2 = AB^2 + \left(\frac{BC}{2}\right)^2 \quad [BD = DE] \rightarrow (i)$
In ΔBCE
$CE^2 = BC^2 + BE^2$
$CE^2 = BC^2 + \left(\frac{AB}{2}\right)^2 \quad [BE = AE] \rightarrow (ii)$
From (i) + (ii)
$AD^2 + CE^2 = AB^2 + \frac{BC^2}{4} + BC^2 + \frac{114^\circ}{2}$
$AD^2 + CE^2 = \frac{5}{4}\ (AB^2 + BC^2)$
$AD^2 + CE^2 = \frac{5}{4}\ AC^2\ [AC^2 = AB^2 + BC^2]$
$CE^2 = \frac{5}{4} \times 100 - 55 = 70$
$CE = \sqrt{70}$ cm



20. (d)



$\angle BCI = \dfrac{180° - 66°}{2}$

$= 57°$

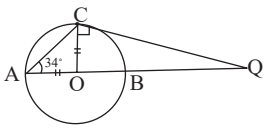
$\angle CBI = \dfrac{180° - 44°}{2} = 68°$

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

$= 180° - 57° - 68°$

$\angle BIC = 55°$

21. (c) AO = OC



$\angle OAC = \angle ACO = 34°$

$\angle COQ = \angle OAC + \angle ACO$

$\angle COQ = 34° + 34° = 68°$

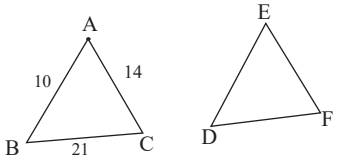
In Δ COQ ,

$\angle COQ + \angle OCQ + \angle CQO = 180°$

$\angle CQO = 180° - 90° - 68° = 22°$

$\angle CQA = \angle CQO = 22°$

22. (d) Δ ABC ~ Δ EDF



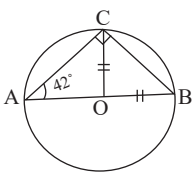
$\dfrac{Ar(\Delta ABC)}{Ar(\Delta EDF)} = \dfrac{49}{4}$

$\left(\dfrac{AC}{EF}\right)^2 = \dfrac{49}{4}$

$\dfrac{AC}{EF} = \dfrac{7}{2} \Rightarrow \dfrac{14}{EF} = \dfrac{7}{2}$

EF = 4 cm

23. (d) $\angle A + \angle B + \angle C = 180°$



$\angle B = 180° - 90° - 42°$

$\angle B = 48°$

OB = OC

$\angle OBC = \angle OCB = 48°$

$\angle BOC + \angle OBC + \angle OCB = 180°$

$\angle BOC = 180° - 48° - 48°$

$\angle BOC = 84°$

24. (a) Δ ABC ~ Δ PQR

$\dfrac{Ar(\Delta ABC)}{Ar(\Delta PQR)} = \left(\dfrac{\text{Perimeters } \Delta ABC}{\text{Perimeters } \Delta PQR}\right)^2$

$= \left(\dfrac{72}{43.2}\right)^2 = \left(\dfrac{5}{3}\right)^2 = \dfrac{25}{9}$

$= 25 : 9$

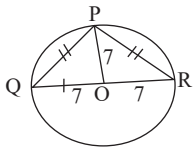
25. (a) If a circle touches all four sides of a quadrilateral PQRS.

then, PQ + RS = SP + RQ

RS = 8 + 12 − 11

= 9 cm

26. (d) PQ = PR



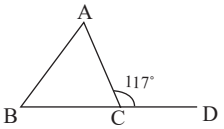
QO = OP = 7 (radius)

$PQ = \sqrt{QO^2 + PO^2}$

$= \sqrt{7^2 + 7^2} = \sqrt{98}$

$PQ = 7\sqrt{2}$ cm

27. (a) $\angle ABC = \dfrac{5}{8}\ \angle BAC$



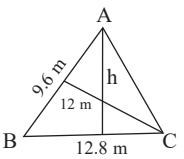
$\angle ABC = 5x$, $\angle BAC = 8x$

$\Rightarrow \angle ABC + \angle BAC = \angle ACD$

$\Rightarrow 5x + 8x = 117° \Rightarrow x = 9$

$\angle ABC = 5 \times 9 = 45°$

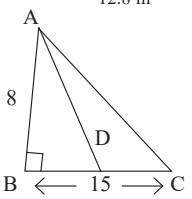
28. (b) Ar (Δ ABC) = Ar (Δ ADC)



$\dfrac{1}{2} \times 12.8 \times h = \dfrac{1}{2} \times 9.6 \times 12$

$h = \dfrac{9.6 \times 12}{12.8} = 9$ m

29. (b) $AC^2 = AB^2 + BC^2$



$\Rightarrow AC = \sqrt{64 + 225}$

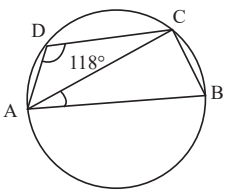
$\Rightarrow AC = 17$ cm

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

$\Rightarrow \dfrac{BD}{DC} = \dfrac{8}{17} \Rightarrow BD + DC = 8x + 17x = 25x$

$BD = 15 \times \dfrac{8}{25} = 4.8$ cm

30. (d) $\angle ABC + \angle ADC = 180°$



$\angle ABC = 180° - 118° = 62°$

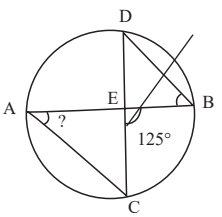
$\angle ABC = 90°$ (angle formed by diameter of the cirde)

Δ ABC ,

$\angle BAC = 180° - \angle ACB - \angle ABC$

$\angle BAC = 180° - 90° - 62° = 28°$

31. (d) $\angle BED = 180° - 125°$



$= 55°$

$\angle BDE = 180° - \angle BED - \angle EBD$

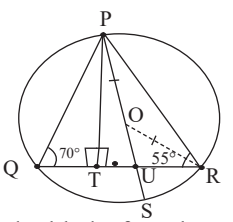
$\angle BDE = 180° - 55° - 28 = 97°$

$\angle BDE = \angle BDC = 97°$

so, $\angle BAC = \angle BDC$ (same segment theorem)

$\angle BAC = 97°$

32. (c) Δ PTQ



$\angle QPT = 180° - 90° - 70°$

$\angle QPT = 20°$

$\angle$ PQR

$\angle P = 180° - 70° - 55° = 55°$

$\angle POR = 2\ \angle PQR$ (Angle at O are doubled of angle at circumference)

$\angle POR = 2 \times 70 = 140°$

In ΔPOR , PO = OR (radius) ,$\angle OPR = \angle ORP$

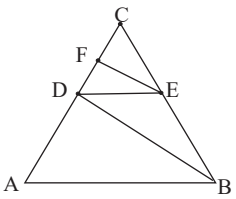
$\angle OPR = \dfrac{180° - \angle POR}{2} = \dfrac{180° - 140°}{2} = 20°$

$\angle TPS = \angle QPR - (\angle QPT + \angle OPR)$

$= 55° - (\ 20° + 20°\ )$

$\angle TPS = 15°$

33. (d) Δ CDE and Δ CAB



$$\frac{CD}{AC}=\frac{CE}{CB}=\frac{DC}{AD+DC}$$

$$\frac{CD}{AC}=\frac{10}{15+10}=\frac{10}{25}=\frac{2}{5}=\frac{CE}{CB}$$

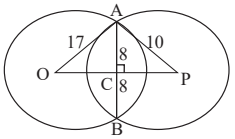
Δ CEF and Δ CDB

$$\frac{5}{OA}\Rightarrow\frac{\sqrt{3}}{2}=\frac{5}{OA}$$

$$\frac{CF}{10}=\frac{2}{5}$$

CF = 4 cm.

34. (c) AC = CB = 8 cm



$OC = \sqrt{OA^2 - AC^2} = \sqrt{289-64}$

OC = 15 cm

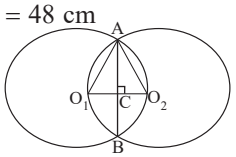
$PC = \sqrt{AP^2 + AC^2} = \sqrt{100-64}$

PC = 6 cm

OP = OC + PC = 15 + 6 = 21cm

Perimeter of Δ OAP = 17 + 10 + 21 = 48 cm

35. (c) AC = CB



$O_1A = O_2A = O_1O_2 = 8$ cm (radius)

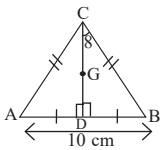
$QC = O_2C = 4$ cm

$AC = \sqrt{O_1A^2 - O_1C^2} = \sqrt{64-16}$

$AC = \sqrt{48} = 4\sqrt{3}$ cm

$AB = 2 \times AC = 2 \times 4\sqrt{3} = 8\sqrt{3}$ cm.

36. (a) The median are divided into a 2:1 ratio by centroid so, CG = 8 cm



GD = 4 cm

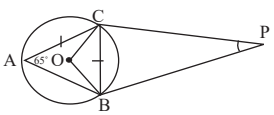
CD = 12 cm

AD = BD = 5 cm

$AC = \sqrt{AD^2+CD^2} = \sqrt{25+144}$

AC = 13 cm

37. (b) $\angle BOC = 2\angle BAC$



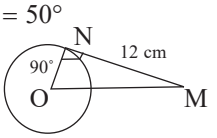
$\angle BOC = 2 \times 65° = 130°$

$\angle OBP = \angle OCP = 90°$

$\angle BOC + \angle OBP + \angle OCP + \angle BPC = 360°$

$\angle BPC = 360° - 130° - 90° - 90° = 50°$

Sol. 38 : (a) $OM^2 = NO^2 + MN^2$

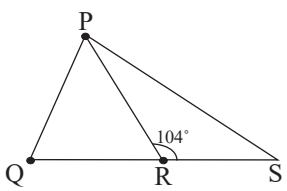


$Om = \sqrt{9^2+12^2}$

$= \sqrt{81+144}$

OM = 15 cm

39. (a) $\angle PQR = \frac{3}{5}\angle QPR$



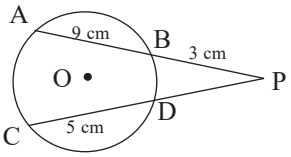
$\angle QPR + \angle PQR = \angle PRS$

$\angle QPR + \frac{3}{5}\angle QPR = 104°$

$\frac{8}{5}\angle QPR = 104°$

$\angle QPR = \frac{104\times5°}{8} = 65°$

40. (d) AB = 9 cm



$PB = \frac{1}{3}AB = 3$ cm

$PA \times PB = PC \times PD$

$12 \times 3 = (5 + PD) \times PD$

$PD^2 + 5PD - 36 = 0$

$(PD + 9)(PD + 4) = 0$

PD = – 9 [Negative]

PD = 4 cm

EXERCISE 18C

For SSC CGL and CPO Exams

1. In ΔABC, the perpendiculars drawn from A, B and C meet the opposite sides at points D,E and F respectively, AD, BE and CF intersect at point P. If $\angle EPD = 110°$ and the bisectors of $\angle A$ and $\angle B$ meet at point Q, then $\angle AQB$ = ?

SSC CGL 21/04/2022 (Shift-2)

(a) 115° (b) 110° (c) 135° (d) 125°

2. O is the center of a circle of radius 10 cm. P is a point outside the circle and PQ is the tangent to the circle. What is the length of PQ if the length of OP is 26 cm?

SSC CGL 21/04/2022 (Shift-1)

(a) $2\sqrt{294}$ (b) 20 (c) 25 (d) 24

3. In a ΔABC, D, E and F are the mid-points of side BC, CA and AB respectively. If BC = 25.6 cm, CA = 18.8 cm and AB = 20.4 cm, what is the perimeter(in cm) of the ΔDEF?

SSC CGL 21/04/2022 (Shift-1)

(a) 36.8 (b) 30.6 (c) 32.4 (d) 34.4

4. In a triangle ABC, the bisector of angle BAC meets BC at point D in such a way that AB = 10 cm, AC = 15 cm and BD = 6 cm. Find the length of BC (in cm)

SSC CGL 21/04/2022 (Shift-1)

(a) 17 (b) 11 (c) 15 (d) 9

5. The radii of two concentric circles with center O are 26 cm and 16 cm. Chord AB of the larger circle is tangent to the smaller circle at C and AD is a diameter. What is the Length of CD?

SSC CGL 21/04/2022 (Shift-1)

(a) 42 (b) 36 (c) 35 (d) 38

6. A circle is circumscribed on a quadrilateral ABCD, If $\angle DAB = 100°$, $\angle ADB = 35°$ and $\angle CDB = 40°$, then find the measure of $\angle DBC$.

SSC CGL 20/04/2022 (Shift-3)

(a) 35° (b) 60° (c) 45° (d) 40°

7. PQRS is a cyclic quadrilateral and PQ is a diameter of the circle. If $\angle RPQ = 23°$, then what is the measure of $\angle PSR$?

SSC CGL 20/04/2022 (Shift-3)

(a) 113° (b) 157 ° (c) 147° (d) 123°

8. In a right triangle ABC, right angle at B, altitude BD is drawn to the hypotenuse AC of the triangle. If AD = 6cm, CD = 5cm , then find the value of $AB^2 + BD^2$(in cm^2)

SSC CGL 20/04/2022 (Shift-1)

(a) 30 (b) 96 (c) 36 (d) 66

9. In a circle with center O, PA and PB are tangents to the circle at point A and point B, respectively, C is a point on the major arc AB, If ∠ACB = 50°, then find the measure of ∠APB .

SSC CGL 20/04/2022 (Shift-1)

(a) 100° (b) 90° (c) 80° (d) 50°

10. A triangle with the lengths of its sides proportional to the numbers 7,24,and 30 is:

SSC CGL 20/04/2022 (Shift-1)

(a) acute angled (b) obtuse angled

(c) not possible (d) right angled

11. Points A and B are on a circle with center O. PA and PB are tangents to the circle from external point P. If PA and PB are inclined to each other at 42°, then find the measure of ∠OAB

SSC CGL 20/04/2022 (Shift-1)

(a) 42° (b) 21° (c) 69° (d) 25°

12. In a right angled triangle, the length of the median from the vertices of acute angle are 7 cm and $4\sqrt{6}$ cm What is the length of the hypotenuse of the triangle (in cm)?

SSC CGL 19/04/2022 (Shift-3)

(a) 3.5 + $2\sqrt{6}$ (b) $\frac{5}{2}\sqrt{29}$ (c) $\sqrt{29}$ (d) $2\sqrt{29}$

13. AB is a chord of a circle with centre O. C is a point on the circumference of the circle in the minor sector. If ∠ABO = 40° what is the measure (in degree) of ∠ ACB?

SSC CGL 19/04/2022 (Shift-3)

(a) 110° (b) 130° (c) 100° (d) 120°

14. Chords AB and CD of a circle intersect externally at P. If AB = 7cm, CD = 1 cm and PD = 5cm, then 50% of the length of PA (in cm) is:

SSC CGL 19/04/2022 (Shift-2)

(a) 5 (b) 10 (c) 8 (d) 3

15. A circle is inscribed in Δ ABC, touching AB, BC and AC at points P, Q and R, respectively. If AB – BC = 4 cm, AB – AC = 2cm and the perimeter of Δ ABC = 32 cm, then $\frac{BC}{2}$ (in cm) = ?

SSC CGL 19/04/2022 (Shift-2)

(a) $\frac{20}{3}$ (b) $\frac{13}{3}$ (c) $\frac{11}{3}$ (d) $\frac{10}{3}$

16. In Δ ABC, ∠A = 66°, BD ⊥ AC and CE ⊥ AB, BD and EC intersect at P. The bisectors ∠PBC and ∠PCB meet at Q What is the measure of ∠BQC?

SSC CGL 19/04/2022 (Shift-2)

(a) 127° (b) 132° (c) 143° (d) 147°

17. The circumcenter of an equilateral triangle is at a distance of 3.2 cm from the base of the triangle. What is the length (in cm) of each of its altitudes?

SSC CGL 19/04/2022 (Shift-2)

(a) 9.6 (b) 7.2 (c) 6.4 (d) 12.8

18. Let Δ ABC ~ Δ QPR and (Area of Δ ABC) : (Area of Δ PQR) = 121 : 64. If QP = 14.4 cm, PR = 12 cm, and AC = 18 cm. Then what is the length of AB (in cm) ?

SSC CGL 19/04/2022 (Shift-1)

(a) 32.4 (b) 21.6 (c) 19.8 (d) 16.2

19. PQ and RS are two parallel chords of a circle of length 14 cm and 48 cm, respectively, and lie on the same side of the centre O. If the distance between the chords is 17 cm, what is the radius of the circle?

SSC CGL 19/04/2022 (Shift-1)

(a) 28 (b) 24 (c) 25 (d) 20

20. In Δ PQR, S is a point on the side QR such that PS is the bisector of ∠QPR. If PQ = 12cm , QS = 3 cm and QR = 7 cm. What is the length of PR?

SSC CGL 18/04/2022 (Shift-3)

(a) 18 (b) 14 (c) 15 (d) 16

21. Triangle ABC is right angled at B. BD is an altitude intersecting AC at D. If AC = 9cm and CD = 3cm, then find the measure of AB (in cm).

SSC CGL 24/08/2021 (Shift-3)

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

22. In a circle with centre O, points A, B, C and D in this order are concyclic such that BD is a diameter of the circle. If ∠BAC = 22°. Then find the measure (in degrees) of ∠COD.

SSC CGL 24/08/2021 (Shift-3)

(a) 158 (b) 68 (c) 79 (d) 136

23. Triangles ABC is right angled at B and D is a point of BC such that BD = 5cm, AD = 13cm and AC = 37cm, then find the length of DC in cm.

SSC CGL 24/08/2021 (Shift-3)

(a) 25 (b) 35 (c) 5 (d) 30

24. In a circle with centre O, a diameter AB is produced to a point P lying outside the circle and PT is a tangent to the circle at a point C on it, If ∠BPT = 28°, then what is the measure of ∠BCP?

SSC CGL 24/08/2021 (Shift-3)

(a) 28° (b) 31° (c) 62° (d) 45°

25. In ΔABC and ΔDEF, we have $\frac{AB}{DF} = \frac{BC}{DE} = \frac{AC}{EF}$, then which of the following is true?

SSC CGL 24/08/2021 (Shift-2)

(a) ΔDEF ~ ΔABC (c) ΔCAB ~ ΔDEF

(b) ΔCAB ~ ΔDEF (d) ΔDEF ~ ΔBAC

26 Points M and N are on the sides PQ and QR respectively of a triangle PQR, right angled at Q. If PN = 9cm, MR = 7cm, and MN = 3cm , then find the length of PR (in cm).

SSC CGL 24/08/2021 (Shift-2)

(a) 13 (b) 11 (c) 12 (d) $\sqrt{41}$

27. In a circle with centre O, AB is a chord of length 10 cm. Tangents at points A and B intersect outside the circle at P. If OP = 2 OA, then find the length (in cm) of AP.

SSC CGL 24/08/2021 (Shift-2)

(a) 10 (b) 12 (c) 12.5 (d) 15

28. Points A, B and C are on a circle with centre O such that ∠BOC = 84°. If AC is produced to a point D such that ∠BDC = 40°, then find the measure of ∠ABD (in degrees).

SSC CGL 24/08/2021 (Shift-2)

(a) 92 (b) 102 (c) 56 (d) 98

29. The vertices of a ΔABC lie on a circle with centre O. AO is produced to meet the circle at the point P. D is a point on BC such that AD ⊥ BC. If ∠B = 68° and ∠C = 52°, then the measure of ∠DAP is:

SSC CGL 24/08/2021 (Shift-1)

(a) 28° (b) 16° (c) 12° (d) 18°

30. ABCD is a cyclic quadrilateral such that when sides AB and DC are produced, they meet at E, and sides AD and BC meet at F, when produced. If ∠ADE = 80° and ∠AED= 50°, then what is the measure of ∠AFB?

SSC CGL 24/08/2021 (Shift-1)

(a) 30° (b) 40° (c) 20° (d) 50°

31. Let ΔABC ~ ΔRPQ and $\frac{ar(\Delta ABC)}{ar(\Delta RPQ)} = \frac{16}{25}$, If PQ = 4cm, QR = 6 cm and PR = 7cm, then AC (in cm) is equal to:

SSC CGL 24/08/2021 (Shift-1)

(a) 7.2 (b) 6 (c) 4.8 (d) 3.6

32. The area of table top in the shape of an equilateral triangle is $9\sqrt{3}$ cm^2 What is the length (in cm) of each side of the table?

SSC CGL 24/08/2021 (Shift-1)

(a) 6 (b) 2 (c) 4 (d) 3

33. The bisector of ∠A in ΔABC meets side BC at D. If AB = 12 cm, AC = 15 cm and BC = 18 cm, then the length of DC is:

SSC CGL 23/08/2021 (Shift-3)

(a) 9 cm (b) 6 cm (c) 10 cm (d) 8 cm

34. Triangles ABC and DBC are right angled triangles with common hypotenuse BC. BD and AC intersect at P, when produced. If PA = 8 cm, PC = 4 cm and PD = 3.2, then the length of BD, in cm, is:

SSC CGL 23/08/2021 (Shift-3)

(a) 5.6 (b) 7.2 (c) 6.4 (d) 6.8

35. ΔABC is an equilateral triangle with side 18 cm, D is a point on BC such that BD = $\frac{1}{3}$ BC, Then length (in cm) of AD is:

SSC CGL 23/08/2021 (Shift-3)

(a) $6\sqrt{3}$ (b) $6\sqrt{7}$ (c) $7\sqrt{6}$ (d) $8\sqrt{3}$

36. In the triangle ABC, D and E are mid-points of AB and BC respectively. If area (ΔCED) = 8 cm^2, then what is the area (ADEC) in cm^2

SSC CGL 23/08/2021 (Shift-2)

(a) 21 (b) 32 (c) 24 (d) 16

37. A tangent is drawn from a point P to a circle, which meets the circle at T such that PT = 8 cm. A secant PAB intersects the circle in points A and B. If PA = 5 cm, what is the length (in cm) of the chord AB?

SSC CGL 23/08/2021 (Shift-2)

(a) 6.4 (b) 8.4 (c) 7.8 (d) 8.0

38. In ΔABC, D is a point on BC such that ∠BAD = $\frac{1}{2}$ ∠ADC and ∠BAC = 77° and ∠C = 45°, What is the measure of ∠ADB?

SSC CGL 23/08/2021 (Shift-2)

(a) 64° (b) 77° (c) 45° (d) 58°

39. A circle is inscribed in a quadrilateral ABCD, touching sides AB, BC, CD and DA at P, Q, R and S, respectively. If AS = 6 cm, BC = 12 cm, and CR = 5 cm, then the length of AB (in cm) is:

SSC CGL 23/08/2021 (Shift-1)

(a) 13 (b) 11 (c) 15 (d) 12

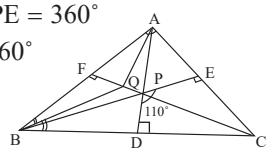
40. Vertices A, B, C and D of a quadrilateral ABCD lie on a circle. ∠A is three times ∠C and ∠D is two times ∠B. What is the difference between the measures of ∠D and ∠C?

SSC CGL 23/08/2021 (Shift-1)

(a) 55° (b) 65° (c) 75° (d) 45°

SOLUTIONS

1. (d) In quadrilateral , PECD,



∠PEC + ∠ECD + ∠CDP + ∠DPE = 360°

⇒ 90° + ∠ECD + 90°+ 110° = 360°

⇒ ∠ECD = 70°

Now , in Δ AQB ,

∠BAQ + ∠AQB + ∠QBA = 180°

$\Rightarrow \frac{\sqrt{A}}{2} + \angle AQB + \frac{\angle B}{2} = 180^\circ$

$\Rightarrow \angle AQB = 180^\circ - \left(\frac{\angle A}{2} + \frac{\angle B}{2}\right)$

$= 180^\circ - \left(90^\circ - \frac{\angle C}{2}\right)$

$= 90^\circ + \frac{70^\circ}{2}$

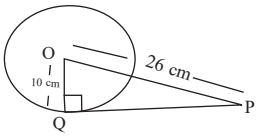
= 90° + 35°= 125°

2. (d) ATQ ,

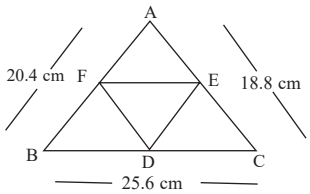
we know that radius is perpendicular to tangent , i . e

∠OQP = 90°

In Δ OQP ,
$(OP)^2 = (OQ)^2 + (QP)^2$
$\Rightarrow (26)^2 = (10)^2 + (QP)^2$
$\Rightarrow (QP)^2 = 676 - 100$
$\Rightarrow QP = \sqrt{576} = 24$ cm

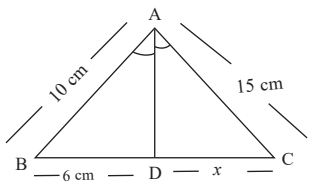


3. (c) ATQ ,
we know that if E and F are mid-points then
EF || CB
and $EF = \frac{1}{2} \times CB$
similarly ,
$DE = \frac{1}{2} \times AB$
and $FD = \frac{1}{2} \times AC$

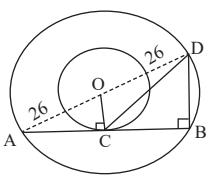


So, perimeter of Δ DEF = DE + EF + FD
$= \sqrt{2r^2} = \sqrt{2}$ r (AB + CB + AC)
$= \frac{1}{2}$ (20.4 + 25.6 + 18.8)
$= \frac{1}{2} \times 64.8 = 32.4$ cm

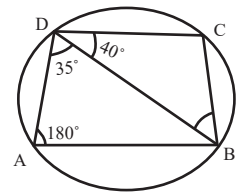
4. (c) since , AD is angle bisector line
$\therefore \frac{AB}{AC} = \frac{BD}{DC}$
$\Rightarrow \frac{10}{15} = \frac{6}{x}$
$\Rightarrow \frac{2}{3} = \frac{6}{x}$
$\Rightarrow x = \frac{6 \times 3}{2} = 9$ cm
$\therefore$ BC = BD + DC
= 6 + 9 = 15 cm



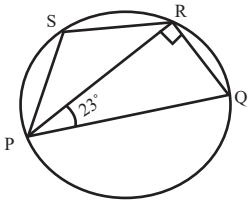
5. (b) Given , OA = OD = 26 cm
and OC =16 cm
we know that OC ⊥ AB
and AC = CB
if a line divides any two sides in same ratio
$\frac{AO}{OD} = \frac{AC}{CB}$, then the line is parallel to the third side
$\therefore$ BD || OC
and BD = 2 × OC = 2 × 16 = 32 cm
in Δ AOC ,AC = $\sqrt{26^2 - 16^2} = \sqrt{420}$ cm = BC
in Δ BCD , CD = $\sqrt{32^2 + \left(\sqrt{420}\right)^2} = \sqrt{1444} = 38$
so , the length of CD is 38 cm



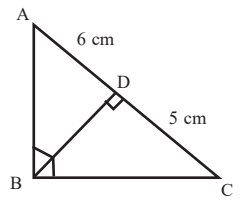
6. (b) we know that ABCD is cyclic quadrilateral
$\angle DAB + \angle BCD = 180^\circ$
$\Rightarrow 100^\circ + \angle BCD = 180^\circ$
$\Rightarrow \angle BCD = 80^\circ$
In Δ BCD ,
$\angle BCD + \angle CBD + \angle DBC = 180^\circ$
$\Rightarrow 80^\circ + 40^\circ + \angle DBC = 180^\circ$
$\Rightarrow \angle DBC = 180^\circ - 120^\circ$
$= 60^\circ$



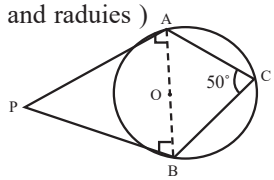
7. (a) ATQ ,
We know that angle in semi - circle is 90° , i . e
$\angle PRQ = 90^\circ$
In Δ PRQ ,
$\angle P + \angle R + \angle Q = 180^\circ$
$\Rightarrow 23^\circ + 90^\circ + \angle Q = 180^\circ$
$\Rightarrow \angle Q = 180^\circ - 113^\circ = 67^\circ$
we know that
$\angle S + \angle Q = 180^\circ$ (cyclic quadrilatral)
$\Rightarrow \angle S = 180^\circ - 67^\circ = 113^\circ$
$\Rightarrow \angle PSR = 113^\circ$



8. (b) ATQ ,
In Δ ABC ,
$AB^2 = AC^2 - BC^2$ .....(i)
And in Δ BDC,
$BD^2 = BC^2 - DC^2$ .....(ii)
On adding Eqs (i) and (ii), we get
$AB^2 + BD^2 = AC^2 - DC^2$
$= (6 + 5) - (5)^2 = 121 - 25 = 96$

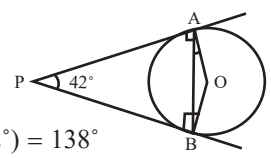


9. (c) ATQ ,
We know that
$\angle PAO = \angle PBO = 90^\circ$ (Tangent and raduies)
and
$\angle AOB = 2\ \angle ACB$
$= 2 \times 50^\circ = 100^\circ$
Now , in quadrilateral PAOB ,
$\angle PAO + \angle AOB + \angle OBP + \angle BPA = 360^\circ$
$\Rightarrow \angle APB = 360^\circ - 90^\circ - 100^\circ - 90^\circ = 80^\circ$

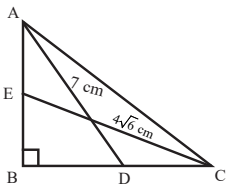


10. (b) Let a = 7 , b = 24 , c = 30
There , $a^2 + b^2 = 7^2 + 24^2 = 25^2 = 625$
And $c^2 = 30^2 = 900$
$\Rightarrow a^2 + b^2 < c^2$
So, it is a obtuse angled triangle

11. (b) :
In quadrilateral,
$\angle AOB = 360^\circ - (90^\circ + 90^\circ + 42^\circ) = 138^\circ$
Now, OA = OB (radius)
$\therefore \angle OAB = \angle OBA$ (opposite angles to equal sides are equal)
In Δ AOB ,
$\angle AOB + \angle OBA + \angle OAB = 180^\circ$
$\Rightarrow 138^\circ + \angle OAB + \angle OAB = 180^\circ$
$\Rightarrow \angle OAB = \frac{42^\circ}{2} = 21^\circ$



12. (d) In right angled triangled AD and CE are medians,



then

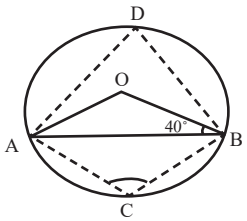
$4(AD^2 + CE^2)=5\ AC^2$

$\Rightarrow 4\ [7^2 + \left(4\sqrt{6}\right)^2\ ] = 5AC^2$

$\Rightarrow AC^2 = \dfrac{580}{5}$

$\Rightarrow AC = 2\sqrt{29}$ cm

13. (b) ATQ, :



Here, OA = OB (radius)

$\therefore \angle OAB = \angle OBA = 40^\circ$

$\Rightarrow \angle AOB = 180^\circ - (40^\circ + 40^\circ)$

$= 100^\circ$

Now,

$\angle ADB = \dfrac{1}{2} \times \angle AOB = 50^\circ$

we know that ACBD is cyclic quadrilateral,

$\therefore \angle ACB + \angle ADB = 180^\circ$

$\Rightarrow \angle ACB = 180^\circ - 50^\circ = 130^\circ$

14. (a) ATQ,

Let PB = x

We know that if two chords of a circle intersect externally, then the product of the length of the segments are equal, i.e.

PA × PB = PC × PD

$\Rightarrow (x + 7)\ x = (5 + 1) \times 5$

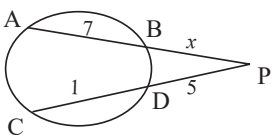
$\Rightarrow x^2 + 7x - 30 = 0$

$\Rightarrow x^2 + 10x - 3x - 30 = 0$

$\Rightarrow x\ (x + 10) - 3\ (x + 10) = 0$

$\Rightarrow (x - 3)\ (x + 10) = 0$

$\Rightarrow x = 3, x = -10$ (invalid)



$\therefore$ 50% of PA = $\dfrac{1}{2} \times (7 + 3) = 5$cm

15. (b)

Given,

AB − BC = 4 ------ (i)

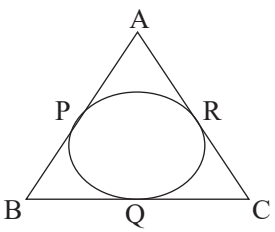
AB − AC = 2 ------ (ii)

AB + BC + CA = 32 ------ (iii)

from Eqs. (i), (ii) and (iii),

3 AB = 38

$\Rightarrow AB = \dfrac{38}{3}$ cm



Now, from Eq. (i); we have

$\dfrac{38}{3} - BC = 4$

$\Rightarrow BC = \dfrac{38}{3} - 4 = \dfrac{26}{3}$ cm

$\therefore \dfrac{BC}{2} = \dfrac{26}{3 \times 2} = \dfrac{13}{3}$ cm

16. (d) :

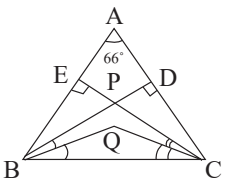
In quad. AEPD,

$\angle EPD = 360^\circ - (90^\circ + 90^\circ + 66^\circ)$

$= 114^\circ$

NOW, $\angle EPD = \angle BPC$

$= 114^\circ$ (vertically opposite angles)



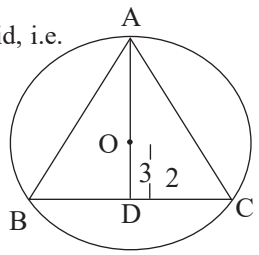
$\therefore \angle BQC = 90^\circ + \dfrac{\angle BPC}{2}$

$= 90^\circ + \dfrac{AD^2}{4}$

$= 147^\circ$

17. (a)

We know that for an equilateral triangle circumcentre is the centroid, i.e.



$\therefore OD = \dfrac{1}{3} \times AD$

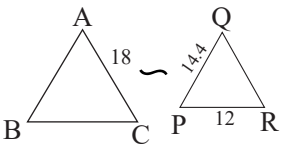
$\Rightarrow 3.2 = \dfrac{1}{3} \times AD$

$\Rightarrow AD = 9.6$ cm

18. (c) ATQ,

If $\Delta ABC \sim \Delta QPR$

Then, $\dfrac{\text{Area of } \Delta ABC}{\text{Area of } \Delta QPR} = \dfrac{AB^2}{QP^2}$



$\Rightarrow \sqrt{\dfrac{121}{64}} = \dfrac{AB}{14.4}$

$\Rightarrow \dfrac{11}{8} = \dfrac{AB}{14.4}$

$\Rightarrow AB = \dfrac{14.4 \times 11}{8} = 19.8$ cm

19. (c)

Let OM = x

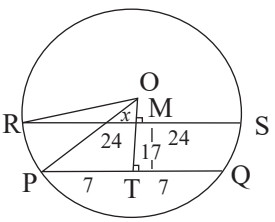
and given MT = 17 cm

In Δ OMR,

$(OR)^2 = 24^2 + x^2$ ….(i)

and in Δ OTP,

$(OP)^2 = 7^2 + (x+17)^2$ ….(ii)



Since, OR = OP (radius)

$\therefore (OR)^2 = (OP)^2$

$\Rightarrow 24^2 + x^2 = 7^2 + (x + 17)^2$

$\Rightarrow 576 + x^2 = 49 + x^2 + 289 + 34x$

$\Rightarrow 34x = 238$

$\Rightarrow x = 7$

$\therefore (OR)^2 = 24^2 + 7^2 = 25^2$

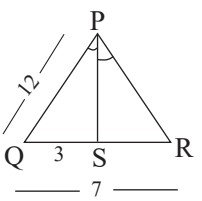
$\Rightarrow OR = 25$

hence, radius of the circle is 25 cm

20. (d)

By angular bisector theorem,

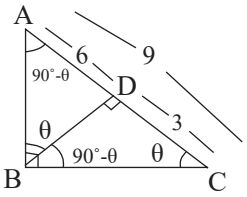
$\dfrac{PQ}{PR} = \dfrac{QS}{SR} \Rightarrow \dfrac{12}{PR} = \dfrac{3}{4}$



$\Rightarrow PR = \dfrac{12 \times 4}{3} = 16$ cm

21. (d) Let $\angle DCB = \theta^\circ$

Then, $\angle DBC = 90^\circ - \theta$



Now,in ΔABC and ΔBDC

$\angle B = \angle D\ (= 90^\circ)$

And $\angle C = \angle C\ (= \theta)$

$\therefore \Delta ABC \sim \Delta BDC$

$\Rightarrow \frac{BC}{AC} = \frac{DC}{BC}$

$\Rightarrow BC^2 = AC \times DC = 9 \times 3 = 27$

In Δ ABC,

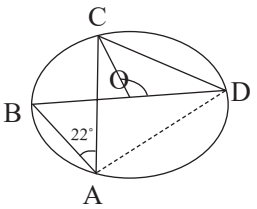
$(AB)^2 + (BC)^2 = (AC)^2$

$\Rightarrow (AB)^2 + 27 = 9^2$

$\Rightarrow AB^2 = 81 - 27 = 54$

$\Rightarrow AB = 3\sqrt{6}$ cm

22. (d)



We know that

$\angle BAD = 90^\circ$

(angle in semi-curile)

$\therefore \angle CAD = 90^\circ - \angle BAC$

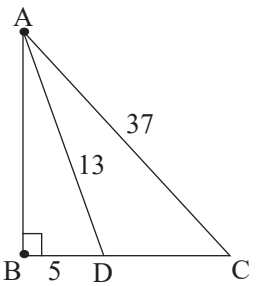
$= 90^\circ - 22^\circ = 68^\circ$

Now, angle made at the centre is twice the angle made on the circumference of the same are

$\therefore \angle COD = 2 \times \angle CAD$

$= 2 \times 68^\circ = 136^\circ$

23. (d)



In Δ ABD,

$AB = \sqrt{13^2 - 5^2} = 12$ cm

Now, in Δ ABC,

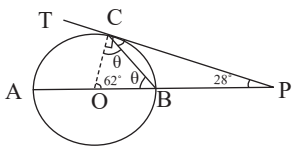
$BC^2 = 37^2 - 12^2$

$\Rightarrow BC = 35$ cm

So, DC = BC – BD

$= 35 - 5 = 30$ cm

24. (b)



In Δ OCP,

$\angle OCP + \angle CPO + \angle COP = 180^\circ$

$\Rightarrow 90^\circ + 28^\circ + \angle COP = 180^\circ$

$\Rightarrow \angle COP = 62^\circ$

We know that

OB = OC (radius)

$\therefore \angle OBC = \angle OCB = \theta$

In ΔCOB,

$\theta + \theta + 62^\circ = 180^\circ$

$\Rightarrow 2\theta = 180^\circ - 62^\circ$

$\Rightarrow \theta = 59^\circ = \angle OCB$

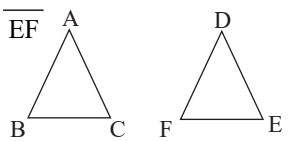
$\angle BCP = \angle OCP - \angle OCB$

$= 90^\circ - 59^\circ = 31^\circ$

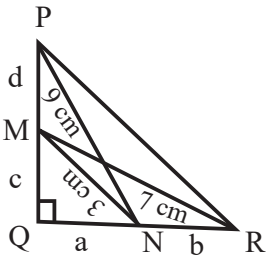
25. (c) we have, $\frac{AB}{DF} = \frac{BC}{DE} = \frac{AC}{EF}$

$\Rightarrow \frac{AB}{DF} = \frac{BC}{DE} = \frac{CA}{EF}$

$\therefore \Delta BCA \sim \Delta DEF$



26. (b)



Let QN = a, NR = b,

QM = c , MP = d

In Δ POR,

$(a + b)^2 + (c + d)^2 = PR^2$

In Δ PQN

$a^2 + (c + d)^2 = 9^2 = 81$....(i)

In Δ MQN

$a^2 + c^2 = 3^2 = 9$....(ii)

In Δ MQR

$(a + b)^2 + c^2 = 7^2 = 49$....(iii)

from Eqs. (i) and (iii),

$(a + b)^2 + a^2 + c^2 + (c + d)^2 = 130$

$\Rightarrow (a + b)^2 + (c + d)^2 = 130 - 9$ .....[from (ii)]

$\Rightarrow (a + b)^2 + (c + d)^2 = 121$

$\Rightarrow (PR)^2 = 121$

$\Rightarrow PR = 11$ cm

27. (a)

Let OA = OB = r

Then, OP = 20A = 2 r

Now, AP, BP, OA, OB form a kite so Of bisects chord AB

$\therefore$ AQ = QB = 5 cm

Also, Δ OAP and Δ OBP are right angled triangled.

In Δ OAP, $\text{Cos}\ (\angle AOP) = \frac{OA}{OP}$

$\Rightarrow \cos(\angle AOP) = \frac{r}{2r} = \frac{1}{2} = \cos 60^\circ$

$\Rightarrow \angle AOP = 60^\circ$

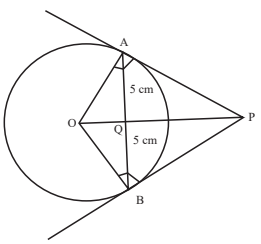
And $\angle OPA = 180^\circ - (90^\circ + 60^\circ) = 30^\circ$

Also, ΔAQO and ΔBQO are right-angles.

$\Rightarrow \angle OAQ = 180^\circ - (90^\circ + 60^\circ) = 30^\circ$

from Δ AQO,

$\cos(\angle QAO) = \frac{AQ}{OA}$



$\Rightarrow \cos 30^\circ = \frac{CE}{CD} = \frac{CE}{CB} = \frac{2}{5}$

$\Rightarrow OA = \frac{10}{\sqrt{3}}$

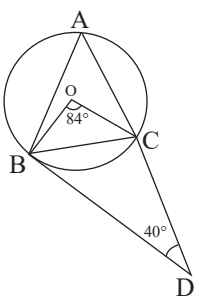
In Δ OAP

$\tan 30^\circ = \frac{OA}{AP}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{10}{\sqrt{3} \times AP}$

$\Rightarrow AP = 10$ cm

28. (d) ATQ,



We know that

$\angle BAC = \frac{\angle BOC}{2} = \frac{84^\circ}{2} = 42^\circ$

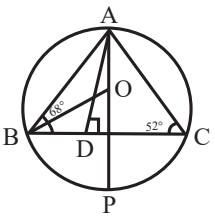
Now, in Δ BAD,

$\angle BAD + \angle BDA + \angle ABD = 180^\circ$

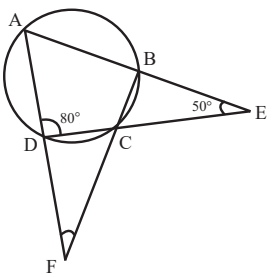
$\Rightarrow 42^\circ + 40^\circ + \angle ABD = 180^\circ$

$\Rightarrow \angle ABD = 180^\circ - 82^\circ$
$= 98^\circ$

29. (b) ATQ,
Join OB.
Now, $\angle BOA = 2 \times 2\ BCA$
$= 2 \times 52^\circ = 104^\circ$
$\Rightarrow OA = OB$ (radius)
$\Rightarrow \angle OBA = \angle OAB$
In Δ BOA,
$\angle OAB + \angle OBA + \angle AOB = 180^\circ$
$\Rightarrow \angle OAB + \angle OAB + 104^\circ = 180^\circ$
$\Rightarrow \angle OAB = 38^\circ$
In Δ ABD,
$\angle BAD = 180^\circ - 90^\circ - 68^\circ = 22^\circ$
So, $\angle DAP = \angle BAO - \angle BAD = 38^\circ - 22^\circ$
$= 16^\circ$



30. (a)
In Δ ADE,
$\angle ADE + \angle DEA + \angle DAE = 180^\circ$
$\Rightarrow 80^\circ + 50^\circ + \angle DAE = 180^\circ$
$\Rightarrow \angle DAE = 180^\circ - 80^\circ - 50^\circ$
$= 50^\circ$
We know that ABCD is cyclic, quadrilateral, i.e.
$\angle ADC + \angle ABF = 180^\circ$
$\Rightarrow 80^\circ + \angle ABF = 180^\circ$
$\Rightarrow \angle ABF = 100^\circ$
Now, in Δ ABF,
$\angle FAB + \angle ABF + \angle AFB = 180^\circ$
$\Rightarrow 50^\circ + 100^\circ + \angle AFB = 180^\circ$
$\Rightarrow \angle AFB = 30^\circ$



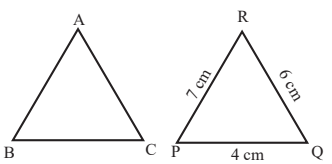
31. (c) ATQ,

Given, $\frac{ar(\Delta ABC)}{ar(\Delta RPQ)} = \frac{16}{25}$

$\Rightarrow \left(\frac{AC}{RQ}\right)^2 = \frac{16}{25}$

$\Rightarrow \frac{AC}{6} = \sqrt{\frac{16}{25}}$

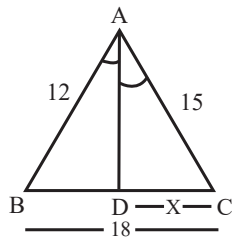
$\Rightarrow AC = \frac{4}{5} \times 6 = \frac{20}{5} = 4.8$ cm



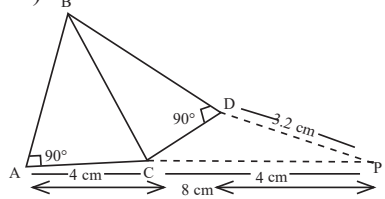
32. (a) :We know that area of equilateral Triangle $= \frac{\sqrt{3}}{4} a^2$

$\Rightarrow 9\sqrt{3} = \frac{\sqrt{3}}{4} a^2$
$\Rightarrow a^2 = 9 \times 4$
$\Rightarrow a = 3 \times 2 = 6$
So, the length of each side is 6 cm.

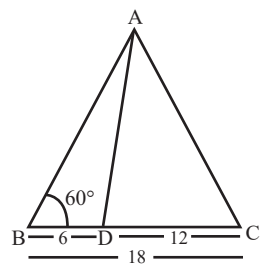
33. (c)
Let DC = x
$\because$ AD is angle bisector, then
$\frac{AB}{AC} = \frac{BD}{DC}$
$\Rightarrow \frac{12}{15} = \frac{18-x}{x} \Rightarrow \frac{4}{5} = \frac{18-x}{x}$
$\Rightarrow 4x - 90 - 5x \Rightarrow 9x = 90$
$\Rightarrow x = 10$



34. (d)
In Δ ABP and Δ DCP
$\Rightarrow \angle A = \angle D$ (90°)
And $\angle P = \angle P$ (Common)
$\therefore \Delta ABP \sim \Delta DCP$
$\Rightarrow \frac{PA}{PD} = \frac{PB}{PC}$
$\Rightarrow \frac{8}{3.2} = \frac{PB}{4}$
$\Rightarrow PB = \frac{8 \times 4}{3.2} = 10$ cm
So, the length of BD = PB – DP
= 10 – 3.2
= 6.8 cm.



35. (b)
Given,
$BD = \frac{1}{3} \times BC$
$= \frac{1}{3} \times 18 = 6$ cm
In Δ ABD,
$\cos B = \frac{(AB)^2 + (BD^2) - (AD)^2}{2 \times AB \times BD}$



$\Rightarrow \cos 60^\circ = \frac{18^2 + 6^2 - AD^2}{2 \times 18 \times 6}$

$\Rightarrow \frac{1}{2} = \frac{324 + 36 - AD^2}{2 \times 18 \times 6}$
$\Rightarrow 108 = 360 - AD^2$
$\Rightarrow AD^2 = 252$
$\Rightarrow AD = 6\sqrt{7}$ cm

36. (c) By midpoint theorem, D and E are mid-points then.
DE || AC and DE = $\frac{AC}{2}$
Let DE = x, then AC = $2x$
Now, DE is the median of BC, and median divides triangle in two equal areas, ie.
$\Delta DEC = \Delta DEB = 8$ cm^2

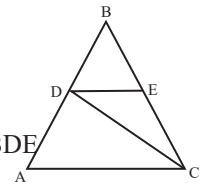
Now, $\frac{ar\ \Delta BDE}{ar\ \Delta BAC} = \left(\frac{DE}{AC}\right)^2$

$\Rightarrow \frac{8}{\text{ar } \Delta BAC} = \frac{x^2}{4x^2}$

$\Rightarrow$ ar Δ BAC = 32 cm^2

$\therefore$ Area of ADEC = ar Δ BAC – ar Δ BDE

= 39 – 8 = 24 cm^2



37. (c)

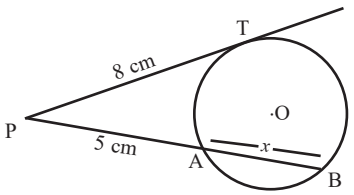
Let AB = x

Then, PT^2 = PA × PB

$\Rightarrow 8^2 = 5 \times (5 + x)$

$\Rightarrow 64 = 25 + 5x$

$\Rightarrow x = \frac{39}{5} = 7.8$ cm



38. (a)

Let $\angle$BAD = θ,

then $\angle$ADC = 2θ

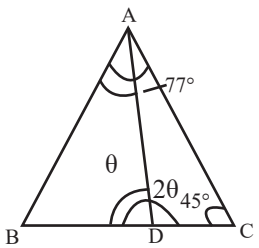
In Δ ABC,

$\angle$A + $\angle$B + $\angle$ C = 180°

$\Rightarrow$ 77° + $\angle$B + 45° = 180°

$\Rightarrow \angle B = 58^\circ = \angle ABC$

Now, In Δ ABD,



$\angle$BAD + $\angle$ADB + $\angle$ABD = 180°

$\theta + (180^\circ - 20) + 58^\circ = 180^\circ$

$\Rightarrow \theta = 58^\circ$

$\therefore \angle ADB = 180^\circ - 2\theta = 180^\circ - 116^\circ = 64^\circ$

39. (a)

We know that

AS = AP = 6 cm.

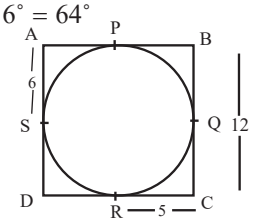
and given BC = 12 cm

but RC = QC = 5 cm

$\Rightarrow$ BQ = 12 – QC = 12 – 5 = 7 cm

But also, PB = BQ = 7 cm

$\therefore$ AB = AP + PB = 6 + 7 = 13 cm



40. (c)

In cyclic quadrilateral

$\angle A + \angle C = 180^\circ$

$\Rightarrow 4x = 180^\circ$

$\Rightarrow \angle C = 45^\circ$

and $\angle B + \angle D = 180^\circ$

$\Rightarrow 3y = 180^\circ \Rightarrow y = 60^\circ$

$\Rightarrow \angle D = 120^\circ$

$\therefore \angle D - \angle C = 120^\circ - 45^\circ = 75^\circ$