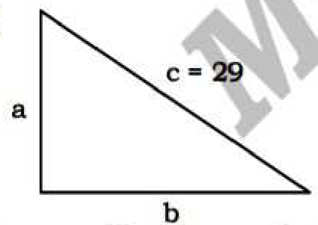
SOLUTIONS

1. (d)

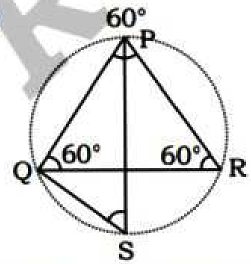


Given, c = 29
and a + b = 41
we know the pythagorean triplet
(20, 21, 29)
and 20 + 21 = 41
$\therefore$ a = 20, b = 21
Hence, b – a = 21 – 20 = 1

Alternate Method:

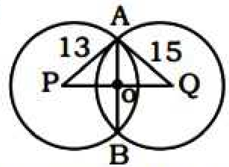
$a^2 + b^2 = 841$
$(41 - b)^2 + b^2 = 841$
$1681 + b^2 - 82b + b^2 = 841$
$2b^2 - 82b + 840 = 0$
$b^2 - 41b + 420 = 0$
$\Rightarrow b(b - 21) - 20(b - 21) = 0$
$\Rightarrow b = 20, 21$
$\therefore a = 21, b = 20$ or $b = 21, a = 20$
$\therefore b - a = 21 - 20 = 1$

2. (b)



$\because \angle PRQ$ and $\angle PSQ$ are in the same side of arc PQ
$\angle PSQ = \angle PRQ = 60°$
$\therefore \angle PSQ = 60°$

3. (d)



AB = 12 cm. AO = OB = 6 cm

$PO = \sqrt{AP^2 - OA^2}$

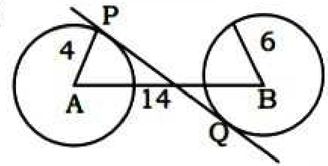
$= \sqrt{169 - 36} = \sqrt{133}$

$OQ = \sqrt{AQ^2 - OA^2}$

$= \sqrt{225 - 36} = \sqrt{189}$

$PQ = \sqrt{133} + \sqrt{189}$

4. (c)



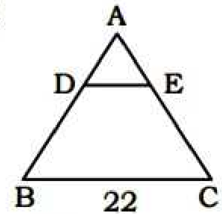
Trans. common tangent PQ

$= \sqrt{\text{Dist b/w centre}^2 - (r_1 + r_2)^2}$

$= \sqrt{14^2 - (4+6)^2}$

$= \sqrt{14^2 - 10^2} = \sqrt{4 \times 24} = 4\sqrt{6}$

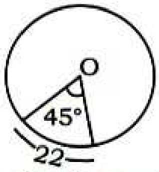
5. (a)



$AD = \frac{1}{6} AB;\quad AE = \frac{AC}{6}$

$DE = \frac{1}{6} BC = \frac{1}{6} \times 22 = \frac{11}{3} = 3.67$

6. (a)



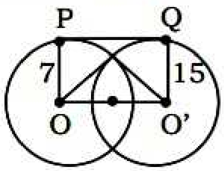
Length of arc = 22

$$\frac{\theta}{360^\circ} \times 2\pi r = 22$$

$$\frac{45^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times r = 22$$

r = 7 × 4 = 28 cm

7. (a)

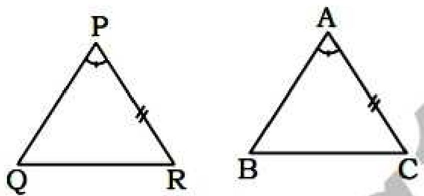


$$PQ = \sqrt{\text{Dist b/w centre}^2 - (r_1 - r_2)^2}$$

$$= \sqrt{(17)^2 - (15-7)^2}$$

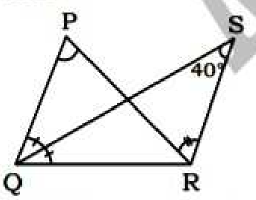
$$= \sqrt{17^2 - 8^2} = \sqrt{9 \times 25} = 15 \text{ cm}$$

8. (a)



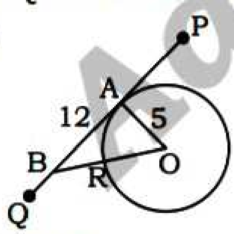
for congruency if PQ = AB
then ΔPQR ≅ ΔABC
By SAS.

9. (a)



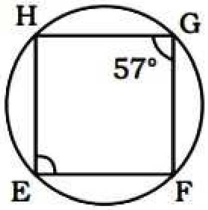
We know,
∠QPR = 2 × ∠QSR
⇒ ∠QPR = 2 × 40° = 80°

10. (c)



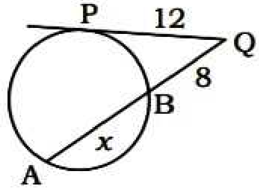
We know,
∠OAB = 90°
Then in ΔOAB:-
$OB^2 = 5^2 + 12^2$
⇒ OB = 13 cm
∴ BR = OB – OR
= 13 – 5 = 8 cm

11. (c)



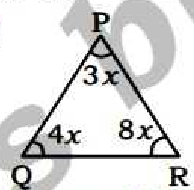
∠HEF = 180° – 57°(The sum of opposite angle of a cyclic quadrilateral is 180°) = 123°

12. (d)



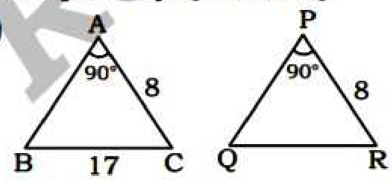
We know,
$PQ^2 = QB \times AQ$
12 × 12 = 8 × (x + 8)
18 = x + 8
⇒ x = 10

13. (d)



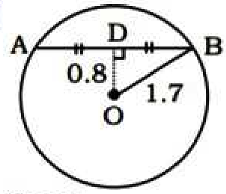
Shortest side is opposite to smallest angle.
and longest side is opposite to largest angle
⇒ Shortest side and longest sides are respectively QR and PQ

14. (d)



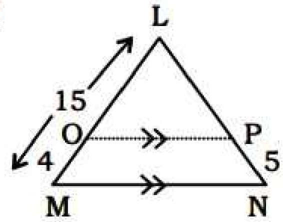
Since, ABC ≅ PQR
AC = PR = 8 cm
BC = QR = 17 cm
In ΔABC,
$AB^2 = BC^2 - AC^2$
⇒ $AB^2 = 17^2 - 8^2$
⇒ $AB = \sqrt{9 \times 25}$ = 3 × 5 = 15 cm

15. (b)



In ΔDOB,
We know, ∠ODB = 90°
∴ $DB^2 = 1.7^2 - 0.8^2$
$DB = \sqrt{0.9 \times 2.5}$
= 1.5
∴ AB = 2 × 1.5 = 3 cm

16. (c)



OP ∥ MN

$$\Rightarrow \frac{LO}{LM} = \frac{LP}{LN}$$

$$\Rightarrow \frac{15-4}{15} = \frac{LP}{5 + LP}$$

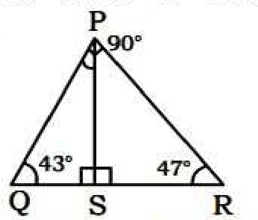
$$\Rightarrow \frac{11}{15} = \frac{LP}{5 + LP}$$

⇒ 55 + 11 LP = 15 LP
⇒ 4 LP = 55

$$LP = \frac{55}{4} = 13.75$$

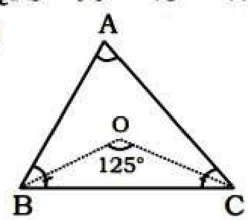
∴ LN = 13.75 + 5 = 18.75

17. (d)



∠PQR = 90° – 47° = 43°
In ΔPQS,
∠QPS = 90° – 43° = 47°

18. (d)

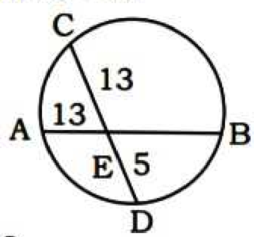


$$\angle BOC = 90^\circ + \frac{1}{2}\angle BAC$$

$$125^\circ = 90^\circ + \frac{1}{2}\angle BAC$$

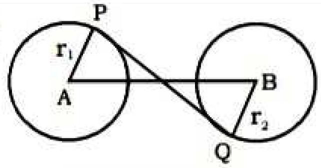
⇒ ∠BAC = 70°

19. (a)



ATQ,
CD = 18 cm
DE = 5 cm
AE = 13 cm
CE = 18 – 5 = 13 cm
AE × BE = CE × DE
13 × BE = 13 × 5
BE = 5 cm

20. (d)



$PQ = \sqrt{AB^2 - (r_1 + r_2)^2}$

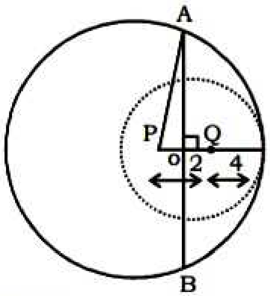
$20 = \sqrt{AB^2 - 15^2}$

$400 = AB^2 - 15^2$

$625 = AB^2$

AB = 25 cm

21. (d)



In ΔPOA,

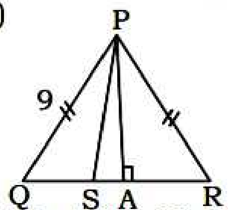
OP = 1 cm

PA = 6 cm

$\Rightarrow OA = \sqrt{6^2 - 1^2} = \sqrt{35} = OB$

$\therefore AB = OA + OB = 2\sqrt{35}$ cm

22. (a)



Let, in ΔPQR, PA $\perp$ QR

$PA = \frac{\sqrt{3}}{2} \times 9 = \frac{9\sqrt{3}}{2}$

$QS = \frac{9}{3} = 3$

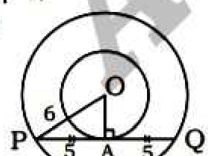
AS = 4.5 – 3 = 1.5

$\therefore PS = \sqrt{PA^2 + AS^2}$

$= \sqrt{\left(\frac{9\sqrt{3}}{2}\right) + \left(\frac{3}{2}\right)^2} = \sqrt{\frac{243}{4} + \frac{9}{4}}$

$= \sqrt{\frac{252}{4}} = \sqrt{63}$

23. (a)



We know, $\angle OAP = 90°$

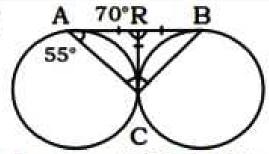
PA = AQ = 5 cm

In ΔOAP,

$OA^2 = OP^2 - PA^2 = 6^2 - 5^2$

$OA = \sqrt{11}$

24. (a)



We know, $\angle ACB = 90°$

Alternate Method:

In ΔARC,

AR = RC (tangents)

$\Rightarrow \angle RCA = 55°$

$\angle ARC = 180° - 110° = 70°$

In ΔRBC,

$\angle CRB = 110°$

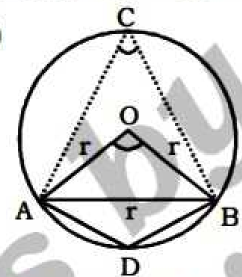
and RC = RB

$\therefore \angle RCB = \angle RBC = \frac{180° - 110°}{2}$

= 35°

$\therefore \angle ACB = 55° + 35° = 90°$

25. (b)



$\angle AOB = 60°$ [$\because$ AO = OB = AB = r]

and $\angle ACB = \frac{60°}{2} = 30°$

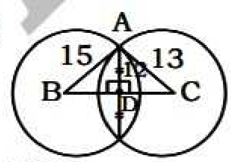
Now, ADBC is a cyclic quad.

$\angle ADB = 180° - 30° = 150°$(Sum of opposite angle of a cyclic quadilateral is 180°)

$\therefore \angle ADB - \angle ACB$

$150° - 30° = 120°$

26. (d)



In ΔABD,

BD = 9 (By pythagorean triplet)

(9, 12, 15)

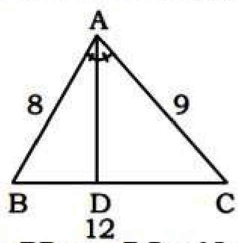
In ΔADC,

DC = 5 (By pythagorean triplet)

(5, 12, 13)

$\therefore$ BC = 9 + 5 = 14 cm

27. (a)



Let, BD = x, DC = $12 - x$

By angle bisector theorems,

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

$\frac{8}{9} = \frac{x}{12 - x}$

$96 - 8x = 9x$

$96 = 17x$

$x = \frac{96}{17}$

$BD = 5\frac{11}{17}$ cm

28. (a) Sum of all 3 angles of a triangle = 180°

$\Rightarrow x + x + 2x = 180°$

$\Rightarrow 4x = 180°$

$\Rightarrow x = 45°$

Largest angle = 90°

$\frac{90}{180} \times 100\% = 50\%$

SMART APPROACH:-

Angles's ratio = 1 : 1 : 2

Largest angles = 2 units

Total Angles = 4 units

Largest angle : Total Angles = 2 : 4

Hence, The largest angle is 50% of the total angles

29. (a) Given,

$\angle A = 80°, \angle B = 40°$

and $\Delta ABC \cong \Delta FDE$

So that,

$\angle A = \angle F, \angle B = \angle D$ and $\angle C = \angle E$

$\angle C = 180° - (\angle A + \angle B)$

$\angle C = 180° - 120°$

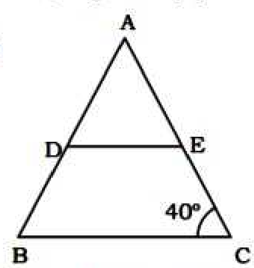
$\angle C = 60°$

$\angle C = \angle E = 60°$

and AB = FD = 5 cm

Hence, Option (a) is correct.

30. (c)



$\angle ACB = AED = 40$

In ΔADE,

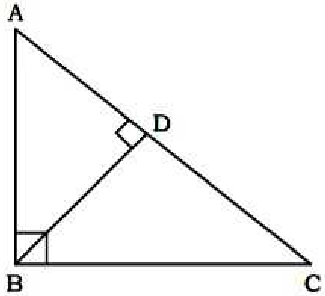
$\angle DAE + \angle ADE + \angle AED = 180°$

$\angle DAE + \angle ADE = 180° - \angle AED$

$\Rightarrow \angle DAE + \angle ADE = 180° - 40°$

$\Rightarrow \angle DAE + \angle ADE = 140°$

31. (c) By the property of R – A – T,

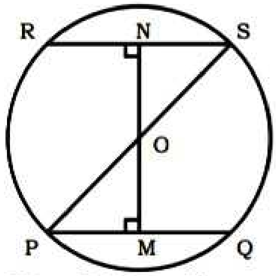


$$AD = \frac{AB^2}{AC}$$

$$\Rightarrow AD = \frac{8 \times 8}{17}$$

$$\Rightarrow AD = 3.76 \text{ cm}$$

32. (a) From figure,



OP = OS = radius

Given,

PQ = 48 cm

RS = 40 cm

Distance between centre, MN = 22 cm

Let OM = x cm

ON = MN – OM = 22 – x

We know that, perpendicular from the center of the circle bisects the chord

$$PM = QM = \frac{PQ}{2} = \frac{48}{2} = 24\text{cm}$$

$$RN = NS = \frac{RS}{2} = \frac{40}{2} = 20 \text{ cm}$$

Now,

$\therefore PM^2 + OM^2 = NS^2 + ON^2$

$\Rightarrow 24^2 + x^2 = 20^2 + (22 - x)^2$

$\Rightarrow 576 + x^2 = 400 + 484 - 44x + x^2$

$\Rightarrow 576 - 884 = -44x$

$\Rightarrow -308 = -44x$

$\Rightarrow -308 = -44x$

$\Rightarrow x = 7\text{cm}$

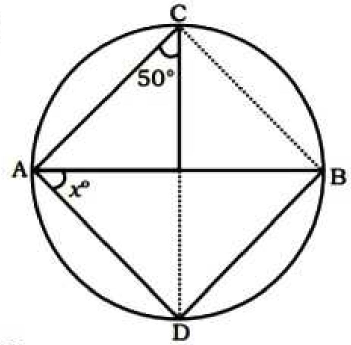
Hence, radius (OP)

$= \sqrt{PM^2 + OM^2} = \sqrt{24^2 + x^2}$

$= \sqrt{24^2 + 7^2} = \sqrt{576 + 49} = \sqrt{625}$

= 25 cm

33. (a)



ATQ,

AB is a diameter of the circle then, $\angle DCB = 40°$

ATF, BD is a chord of the circle then, $\angle DAB = \angle DCB = 40°$

34. (d) Let the greatest side of ΔPQR is x cm

Given,

$\Delta ABC \sim \Delta PQR$

By the property of similarity,

$$\Rightarrow \frac{\text{Ratio of sides of } \Delta ABC}{\text{Ratio of sides of } \Delta PQR}$$

$$= \sqrt{\frac{ar\Delta ABC}{ar\Delta PQR}}$$

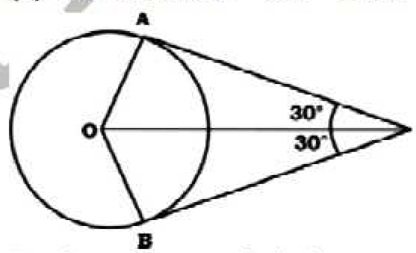
$$\Rightarrow \frac{24}{x} = \sqrt{\frac{64}{144}}$$

$$\Rightarrow \frac{24}{x} = \frac{8}{12}$$

$$\Rightarrow x = \frac{12 \times 24}{8} = 36 \text{ cm}$$

Length of the greatest side of the ΔPQR = 36 cm.

35. (b) Given, radius = OA = 3 cm



By the property of circle,

$$\angle OPA = \frac{\angle APB}{2}$$

$$\angle OPA = \frac{60°}{2} = 30°$$

In ΔOAP,

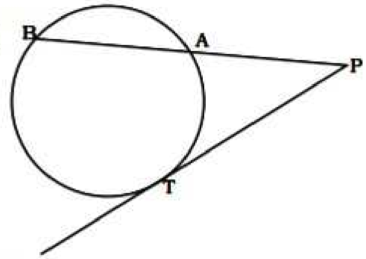
$$\tan P = \frac{OA}{AP}$$

$$\Rightarrow \tan 30° = \frac{3}{AP}$$

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

$$\Rightarrow AP = 3\sqrt{3} \text{ cm}$$

36. (b)



We know that, $PT^2 = PA \times PB$

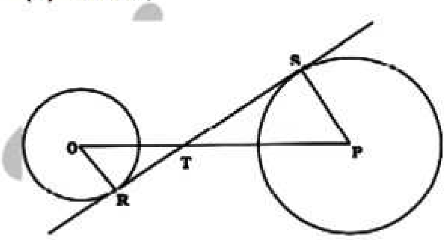
$\Rightarrow 12^2 = PA \times 24$

$\Rightarrow 144 = PA \times 24$

$\Rightarrow PA = 6$

$\therefore AB = PB - PA = 24 - 6 = 18$ cm

37. (a) Given,



RT = 16 cm

TS = 24 cm

OR = 10 cm

PS = x cm

In figure,

$\angle ORT = \angle PST = 90$

$\angle OTR = \angle PTS$

$\therefore \angle TOR = \angle TPS$

by the AAA similarity, $\Delta ORT \sim \Delta PST$

$$\Rightarrow \frac{OR}{PS} = \frac{RT}{ST}$$

$$\Rightarrow \frac{10}{x} = \frac{16}{24}$$

$\Rightarrow x = 15$ cm

38. (d) Let the all three angles of triangles a, b and c.

According to questions, one angle is 70 degree and other two angle is equal.

Hence, a = b = x and c = 70°

We know that, sum of all three angles of a triangle is 180°

a + b + c = 180°

$\Rightarrow x + x + 70° = 180°$

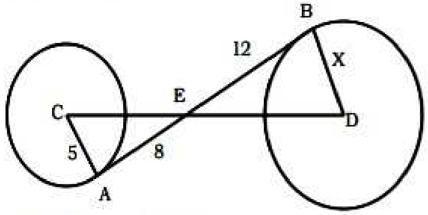
$\Rightarrow 2x = 180° - 70°$

$\Rightarrow 2x = 110°$

$\Rightarrow x = 55°$

Unknown angle = 55°

39. (b) In figure,



$\angle CAE = \angle DBE$

$\angle AEC = \angle BED$

$\angle ECA = \angle EDB$

Hence, $\Delta CAE \sim \Delta DBE$

$\frac{CA}{DB} = \frac{AE}{BE}$

$\Rightarrow \frac{5}{x} = \frac{8}{12}$

$\Rightarrow x = 7.5$

In ΔCAE

$CE = \sqrt{AC^2 + AB^2}$

$= \sqrt{5^2 + 8^2} = \sqrt{89} = 9.43$

Again in ΔDBE

$DE = \sqrt{BD^2 + BE^2} = \sqrt{7.5^2 + 12^2}$

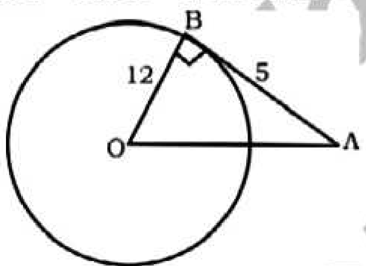
$= \sqrt{56.25 + 144} = \sqrt{200.25} = 14.15$

Distance between Centre,

CD = CE + DE

= 9.43 + 14.15 = 23.58 units

40. (d)

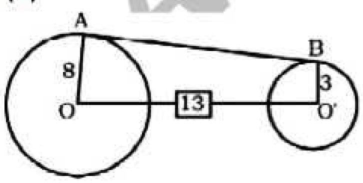


$OA = \sqrt{OB^2 + AB^2}$

$= \sqrt{12^2 + 5^2}$

$= \sqrt{144 + 25} = \sqrt{169} = 13$ cm

41. (b)

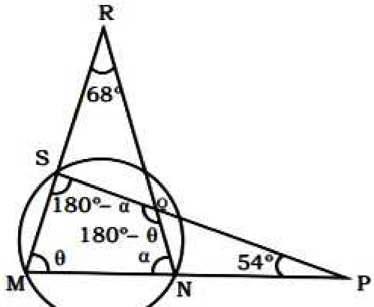


$AB = \sqrt{(DBC)^2 - (R - r)^2}$

$= \sqrt{13^2 - (8-3)^2}$

$= \sqrt{169 - 25} = \sqrt{144} = 12$ cm

42. (a)



Let $\angle RMN = \theta$

and $\angle MNR = \alpha$

We know, sum of opposite angles in cyclic quadrilateral is 180°

So, $\angle PSM = 180° - \alpha$

In ΔRMN,

$\Rightarrow \angle RMN + \angle MNR + \angle MRN = 180°$

$\Rightarrow \theta + \alpha + 68° = 180°$

$\Rightarrow \theta + \alpha = 112°$ ....(1)

Again, in ΔPSM,

$\Rightarrow \angle PSM + \angle SMP + \angle MPS = 180°$

$\Rightarrow 180° - \alpha + \theta + 54° = 180°$

$\Rightarrow \theta + 54° = \alpha$

From equation(1)

$\Rightarrow \theta + \theta + 54° = 112°$

$\Rightarrow 2\theta = 112° - 54°$

$\Rightarrow \theta = \frac{58°}{2}$

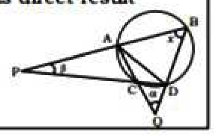
$\Rightarrow \theta = 29°$

Therefore, $\angle RMN = \angle SMN = 29°$

SMART APPROACH:-

Just remember this direct result

$\boxed{x = 90 - \frac{(\alpha + \beta)}{2}}$

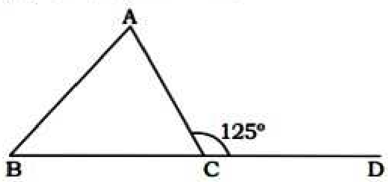


43. (c) Ratio of areas of triangles

$= \left(\frac{36}{24}\right)^2 = \frac{9}{4}$

Thus, Ratio = 9 : 4

44. (d) Given, AB = AC



Hence, $\angle ABC = \angle ACB$

By the linear pair

$\angle ACB + \angle ACD = 180°$

$\angle ACB = 180° - \angle ACD$

$= 180° - 125° = 55°$

By the exterior angle.

$\angle ABC + \angle BAC = 125°$

$\Rightarrow 55° + \angle BAC = 125°$

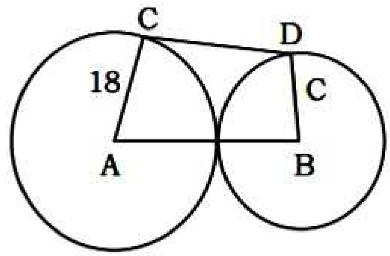
$\Rightarrow \angle BAC = 125° - 55° = 70°$

45. (c)

AC = R = 18 cm

BD = r = 8 cm

AB = 18 + 8 = 26 cm



$DCT, CD = \sqrt{(AB)^2 - (R - r)^2}$

$= \sqrt{AB^2 - (AC - BD)^2}$

$= \sqrt{26^2 - (18 - 8)^2}$

$= \sqrt{676 - 100}$

$= \sqrt{576} = 24$ cm

46. (a)

Since, DE $\parallel$ BC in ΔABC

$\frac{AD}{DB} = \frac{AE}{EC}$

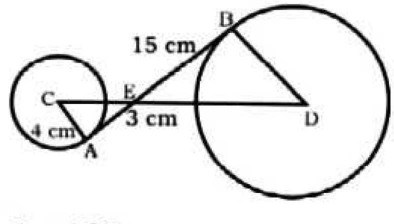
$\Rightarrow \frac{5}{10} = \frac{8}{EC}$

$\Rightarrow$ EC = 16 cm

AC = AE + EC

= 8 + 16 = 24 cm

47. (d)



In ΔACE

$CE = \sqrt{4^2 + 3^2} = \sqrt{25} = 5$ cm

$\Delta CAE \sim \Delta DBE$

$\Rightarrow \frac{CE}{DE} = \frac{AE}{EB}$

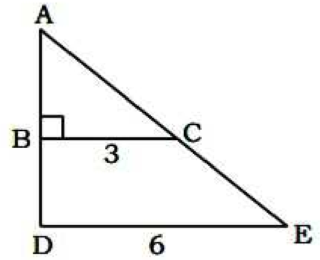
$\Rightarrow \frac{5}{DE} = \frac{3}{15}$

$\Rightarrow$ DE = 25 cm

Distacne between Center, CD

= CE + ED = 5 + 25 = 30 cm

48. (d) Given,



BD = 4 unit

Let AB = x unit

AD = AB + BD

= x + 4 unit

$\Delta ABC \sim \Delta ADE$

$\Rightarrow \frac{AB}{AD} = \frac{BC}{DE}$

$\Rightarrow \frac{x}{x+4} = \frac{3}{6}$

$\Rightarrow 6x = 3x + 12$

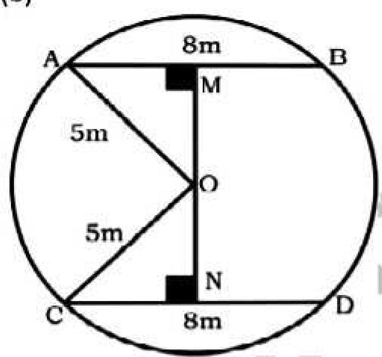
$\Rightarrow 6x - 3x = 12$

$\Rightarrow 3x = 12$

$\Rightarrow x = 4$ unit

Hence, Length of AB = 4 unit.

49. (b)



Given, Radius = 5 m

AB = CD = 8 m

We know that,

Perpendicular from the center of the circle bisects the chord.

Hence, $AM = \frac{AB}{2}$

$= \frac{8m}{2} = 4$ m

And, $CN = \frac{AB}{2} = \frac{8m}{2} = 4$ m

In ΔAMO, $OM^2 = OA^2 - AM^2$

$= 5^2 - 4^2 = 9$

$\therefore OM = 3$ m

In ΔCNO, $ON^2 = OC^2 - CN^2$

$= 5^2 - 4^2 = 9$

$\therefore ON = 3$ m

Thus, The distance between center = OM + ON

= 3 + 3 = 6m

Alternate Method:

Distance between center

$= 2 \times \sqrt{5^2 - \left(\frac{8}{2}\right)^2} = 2\sqrt{5^2 - 4^2}$

$= 2\sqrt{25-16} = 2\sqrt{9} = 6$ m

50. (b)

Let $2\angle A = 3\angle B = 6\angle C = k$

$\angle A = \frac{k}{2}$ $\quad \angle B = \frac{k}{3}$ $\quad \angle C = \frac{k}{6}$

We know that,

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

$\Rightarrow \frac{k}{2} + \frac{k}{3} + \frac{k}{6} = 180°$

$\Rightarrow \frac{3k + 2k + k}{6} = 180°$

$\Rightarrow \frac{6k}{6} = 180°$

$\Rightarrow k = 180°$

Thus,

$\angle A = \frac{k}{2} = \frac{180°}{2} = 90°$

$\angle B = \frac{k}{3} = \frac{180°}{3} = 60°$

$\angle C = \frac{k}{6} = \frac{180°}{6} = 30°$

The value of largest angle = 90°

Alternate Method:

Using Ratio–

$2\angle A = 3\angle B = 6\angle C$

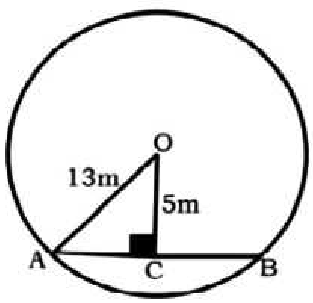
$\Rightarrow \frac{2\angle A}{36} = \frac{3\angle B}{36} = \frac{6\angle C}{36}$

$\Rightarrow \frac{\angle A}{18} = \frac{\angle B}{12} = \frac{\angle 3}{6}$

Largest Angle,

$\angle A = 180° \times \frac{18}{18+12+6} = 90°$

51. (a) In ΔACO,



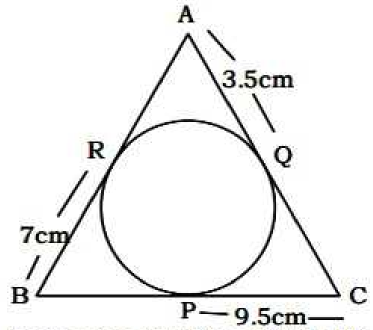
$AC = \sqrt{AO^2 - OC^2} = \sqrt{13^2 - 5^2}$

$= \sqrt{169 - 25}$

$= \sqrt{144} = 12$ cm

AB = 2 × AC = 24 cm

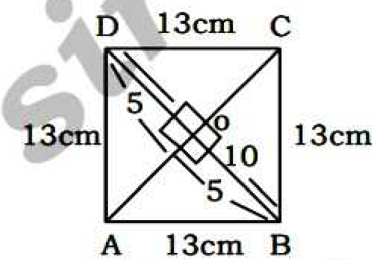
52. (d)



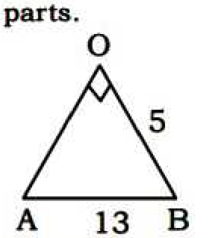
Perimeter of ΔABC = 2(AQ + PC + BR)

= 2(3.5 + 4.5 + 7) = 2 × 15 = 30 cm

53. (c)



In a rhombus two diagonals intersect each other at 90° in equal parts.



In a triangle AOB

$AO = \sqrt{13^2 - 5^2}$

= 12 cm

$\because$ AO = 12 cm So, OC = 12 cm

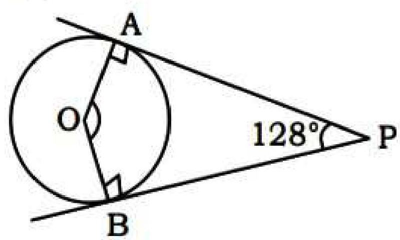
AC = 24 cm

Area of a rhombus $= \frac{1}{2} \times BD \times AC$

$= \frac{1}{2} \times 10 \times 24$

= 120 cm²

54. (a)

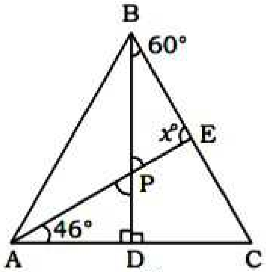


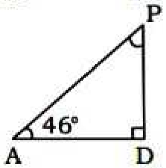
$\because \angle AOB + \angle APB = 180°$

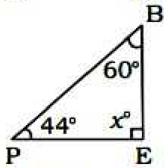
$\angle AOB = 180° - 128° = 52°$

$\angle OAB = \frac{180 - 52}{2} = 64°$

55. (a)







$\because \angle APD = \angle BPE$

In Triangle APD

$\angle APD = 44°$

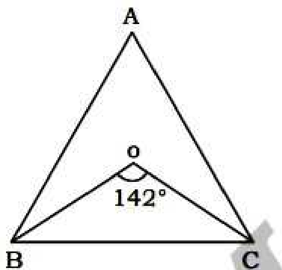
$\angle BPE = 44°$

$\angle BEP = x°$

$x + 44° + 60° = 180°$

$x = 76°$

56. (d)



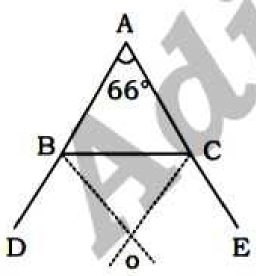
$\angle BOC = 90° + \frac{\angle A}{2}$

$142° = 90° + \frac{\angle A}{2}$

$\frac{\angle A}{2} = 52°$

$\angle A = 104°$

57. (c)



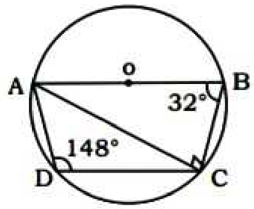
$\therefore \angle A = 66°$

$\angle BOC = ?$

$\angle BOC = 90° - \frac{\angle A}{2}$

$= 90° - \frac{66°}{2} = 90° - 33° = 57°$

58. (c)



$\because \angle ADC = 148°$

$\angle ABC = 180° - 148° = 32°$

$\angle BAC = 90° - 32° = 58°$

59. (b) If $\Delta ABC \sim \Delta RPQ$

Then, $\frac{AB}{RP} = \frac{BC}{PQ} = \frac{AC}{RQ}$

$= \frac{\sqrt{ar(\Delta ABC)}}{\sqrt{ar(\Delta RPQ)}}$

$\because \frac{ar(\Delta ABC)}{ar(\Delta RPQ)} = \frac{BC^2}{PQ^2}$

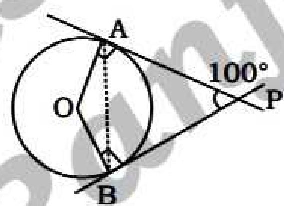
$\frac{4}{9} = \frac{16}{PQ^2}$ [$\because$ BC = 4cm]

$PQ^2 = 36$

$PQ^2 = 6^2$

PQ = 6 cm

60. (a)

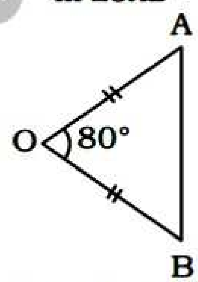


$\because \angle APB = 100°$

$\angle APB + \angle AOB = 180°$

$\angle AOB = 180° - 100 = 80°$

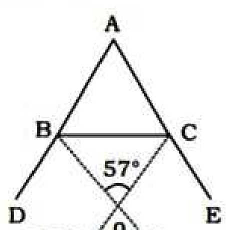
In ΔOAB -



OA = OB = radius of circle

$\angle OAB = 50°$

61. (c)



$\angle BOC = 57°$

$\angle A = ?$

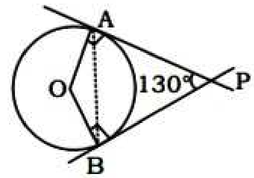
$\angle BOC = 90° - \frac{\angle A}{2}$

$\frac{\angle A}{2} = 90° - \angle BOC$

$\frac{\angle A}{2} = 90° - 57°$

$\angle A = 66°$

62. (c)



$\angle AOB = 180° - 130° = 50°$

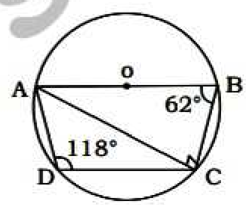
In ΔOAB

$\angle AOB = 50°$

$\angle OAB = \frac{130°}{2} = 65°$

$\because$ OA = OB = radius of circle

63. (b)



$\angle ABC = 180° - 118° = 62°$

$\angle BAC = 90° - 62° = 28°$

64. (d) $\because \Delta ABC \sim \Delta RPQ$

$\frac{AB}{RP} = \frac{BC}{PQ} = \frac{AC}{RQ} = \frac{\sqrt{ar(\Delta ABC)}}{\sqrt{ar(\Delta RPQ)}}$

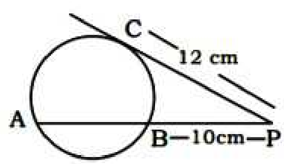
$\frac{\sqrt{4}}{\sqrt{9}} = \frac{AB}{RP}$

$\frac{2}{3} = \frac{3}{RP}$ [$\because$ AB = 3cm]

$RP = \frac{9}{2}$

RP = 4.5 cm

65. (d)



$\because$ PC = 12 cm

PB = 10 cm

AB = ?

$AP \times BP = PC^2$

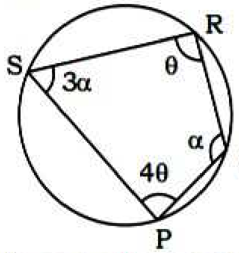
$(AB + 10) \times 10 = 12^2$

$AB + 10 = \frac{144}{10}$

AB = 14.4 – 10

AB = 4.4 cm

66. (a)



In a cyclic qudrilateral sum of opposite angles is 180°

$\theta + 4\theta = 180°$

then,

$\theta = 36°$

Similarly

$\alpha + 3\alpha = 180°$

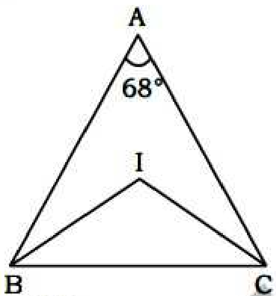
then,

$\alpha = 45°$

Average of $\angle\theta$ and $\angle\alpha = \frac{36° + 45°}{2}$

$= \frac{81°}{2} = 40.5°$

67. (a)



$\angle A = 68°$

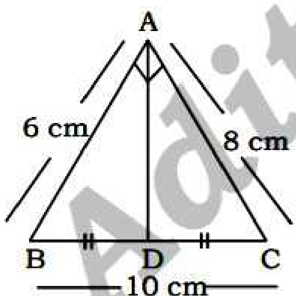
$\angle BIC = ?$

In an incertric triangle–

$\angle BIC = 90° + \frac{\angle A}{2} = 90° + \frac{68°}{2}$

$= 90° + 34° = 124°$

68. (b)



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

This is a right angle triangle

$\angle A = 90°$

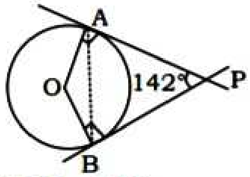
we know, In a right angle triangle the length of the median is always half of the hypotaneus

then,

BD = DC = AD

AD = 5cm

69. (c)



$\because \angle APB = 142°$

$\angle AOB = 180° - 142°$

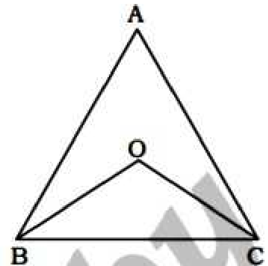
$= 38°$

In ΔOAB –

$\because$ OA = OB = radius of circle

$\angle OAB = \frac{180 - 38}{2} = \frac{142°}{2} = 71°$

70. (b)



$\angle BOC = 134°$

In an incetric triangle –

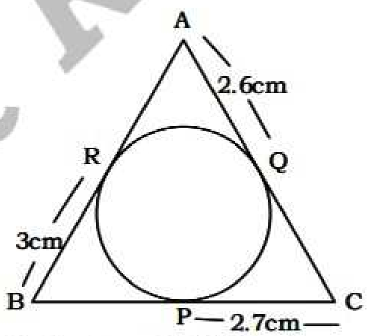
$\angle BOC = 90° + \frac{\angle A}{2}$

$134° = 90 + \frac{\angle A}{2}$

$\frac{\angle A}{2} = 44°$

$\angle A = 88°$

71. (c)



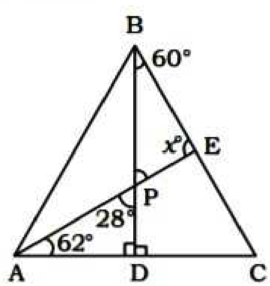
Perimeter of ΔABC = ?

Perimeter of ΔABC = 2(AQ + PC + BR)

= 2(2.6 + 2.7 + 3) = 2 × 8.3

= 16.6 cm

72. (d)



$x° = ?$

$\angle APD = 90° - 62° = 28°$

$\because \angle APD = \angle BPE$

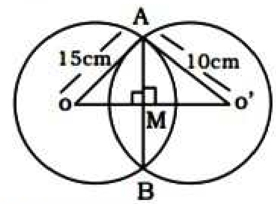
In triangle BPE

$60° + x° + 28° = 180°$

$x° = 180° - 88°$

$x° = 92°$

73. (c)



AB = 16 cm

$AM = \frac{AB}{2} = 8$ cm

In ΔOMA –

$OM = \sqrt{15^2 - 8^2} = \sqrt{161}$ cm

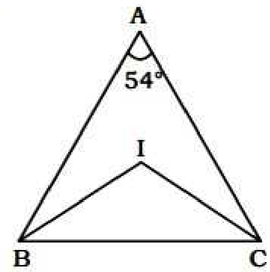
In O'MA –

$O'M = \sqrt{10^2 - 8^2} = 6$ cm

Distance between their centre (OO') = O'M + OM

$= (6 + \sqrt{161})$ cm

74. (d)



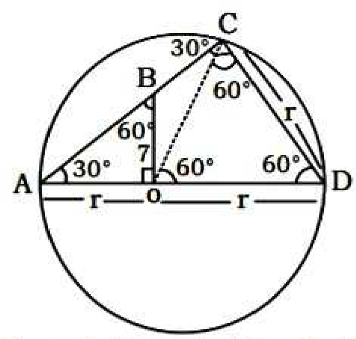
In an incentric triangle

$\angle BIC = 90° + \frac{\angle A}{2}$

$\angle BIC = 90° + \frac{54°}{2}$

$= 90° + 27° = 117°$

75. (c)



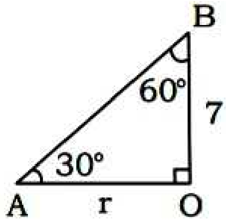
In a right angle triangle ACD

$AD^2 = DC^2 + AC^2$

$AC^2 = (2r)^2 - r^2$

$AC = r\sqrt{3}$

In $\angle AOB$



$\tan 30° = \frac{7}{r}$

$r = 7\sqrt{3}$ cm

$\sin 30° = \frac{7}{AB}$

$\frac{1}{2} = \frac{7}{AB}$

AB = 14 cm

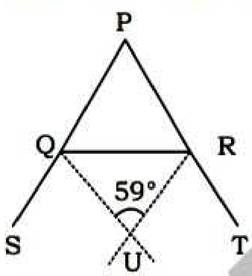
$\because AC = r\sqrt{3}$

$AC = 7\sqrt{3} \times \sqrt{3} = 21$ cm

AB = 14 cm

BC = AC – AB = 21 – 14 = 7 cm

76. (d)



$\angle QUR = 59°$

$\angle P = ?$

$\because \angle QUR = 90° - \frac{\angle P}{2}$

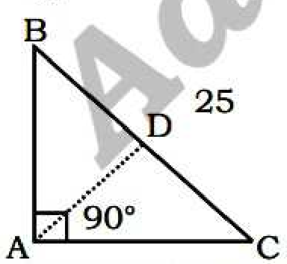
$\frac{\angle P}{2} = 90° - \angle QUR$

$= 90° - 59° = 31°$

$\angle P = 31° \times 2$

$\angle P = 62°$

77. (b)



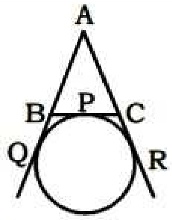
BAC is right-angle triangle, BC is hypotenuse

We know,

in right triangle

$\text{Median} = \frac{\text{hypotenuse}}{2} = \frac{25}{2} = 12.5$ cm

78. (b)



AQ = AR

BP = BQ

CP = CR

Perimeter of ΔABC = AB + BP + PC + AC

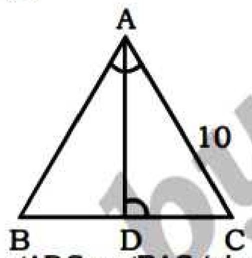
26.4 = AB + BQ + CR + AC

26.4 = AQ + AR

26.4 = 2AQ

$AQ = \frac{26.4}{2} = 13.2$ cm

79. (a)



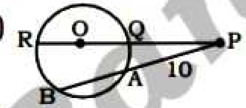
$\angle ADC = \angle BAC$ (given)

$\Delta DCA \sim \Delta ACB$

$\frac{CD}{AC} = \frac{AC}{BC} \Rightarrow \frac{CD}{10} = \frac{10}{16}$

$= CD = 6.25$ cm

80. (c)



Given,

PA = 10

PB = 16

OP = 14

OR = OQ,

PQ = (14 – OQ)

PR = (14 + OQ)

We know,

PQ × PR = PA × PB

(14 – OQ) (14 + OQ) = 10 × 16

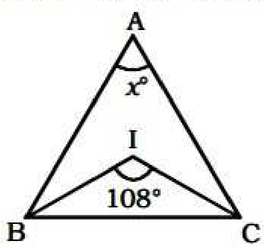
$(14^2 - OQ^2) = 160$

$OQ^2 = 36$

OQ = 6cm

Diameter = 2 × 6 = 12 cm

81. (d)

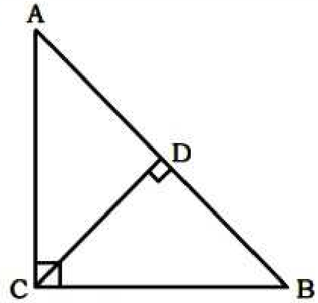


$BIC = 90 + \frac{x}{2}$

$= 90 + \frac{x}{2} = 108°$

$= x = 36°$

82. (d)



Given that,

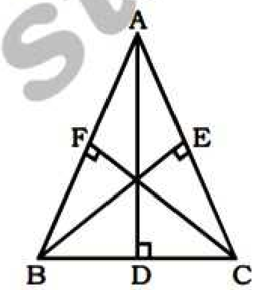
$\frac{AD}{DB} = \frac{\sqrt{k}}{1}$

We know,

$\rightarrow AC^2 : BC^2 = AD : BD$

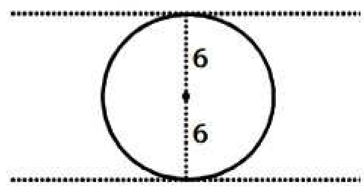
$\rightarrow AC : BC = \sqrt[4]{k} : 1$

83. (d)



$3AC^2 = 4BE^2$ (This is a theorem)

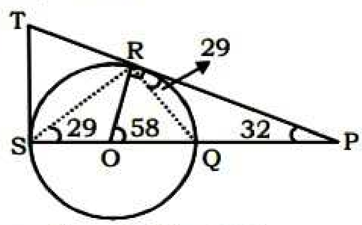
84. (b)



Required distance

(6 + 6) = 12cm

85. (d)



Given that $\angle SPT = 32°$

Then,

in ΔROP

$\Rightarrow \angle R = 90°, \angle P = 32°$

Then,

$\angle O = 180° - (90 + 32) = 58°$

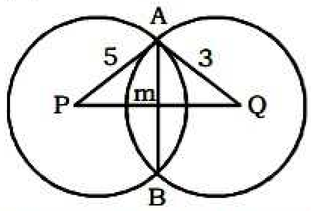
Then,

$\angle RSQ = \frac{58}{2} = 29°$

We know,

$\angle RSQ = \angle QRP = 29°$

86. (d)



AP = 5 cm, AQ = 3cm and PQ = 6cm

Let PM = x cm

In, ΔAMP

$(PA)^2 = (AM)^2 + (PM)^2$

$25 = (AM)^2 + x^2$

$(AM)^2 = 5 - x^2$

In ΔAQM

$(AQ)^2 = (AM)^2 + (6 - x)^2$

$9 = (AM)^2 + 36 + x^2 - 12x$

$(AM)^2 = 9 - 36 - x^2 + 12x$

$25 - x^2 = 9 - 36 - x^2 + 12x$

$x = \frac{52}{12} = \frac{13}{3}$

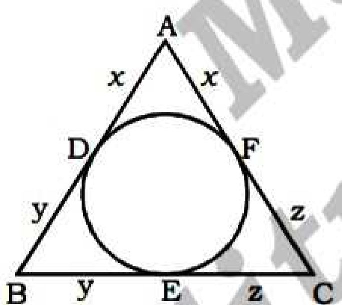
$(AM)^2 = 25 - x^2 = 25 - \frac{169}{9} = \frac{56}{9}$

$AM = \sqrt{\frac{56}{9}} = \frac{2\sqrt{14}}{3}$ cm

So,

$AB = 2 \times AM = \frac{2 \times 2\sqrt{14}}{3} = \frac{4\sqrt{14}}{3}$ cm

87. (a)



We know,

AD = AF, FC = EC and BE = BD

AB = 12 cm, BC = 8cm, BE = BD

AB = 12 cm, BC = 8 cm, AC = 10cm (given)

$2(x + y + z) = (12 + 8 + 10)$

$= 2(x + y + z) = 30$ cm

$= (x + y + z) = 15$ cm

In ΔABC $(x + y) = 12$ cm

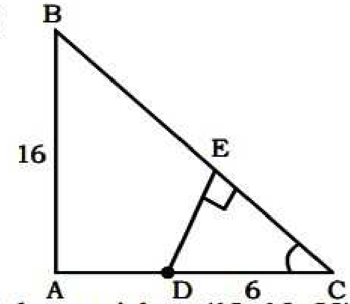
$y + z = 8$ cm

$z = 3$ cm and $x = 7$ cm

Difference = AD – CE

= (7 – 3) = 4 cm

88. (a)



We know triplet = (12, 16, 20)

So, BC = 20

Area of $\Delta ABC = \frac{1}{2} \times 12 \times 16$

$= 96cm^2$

$\Delta ABC \sim \Delta EDC$

$\frac{\text{Area of } \Delta EDC}{\text{Area of } \Delta ABC} = \left(\frac{DC}{BC}\right)^2$

Area of $\Delta EDC = \frac{96 \times 36}{400} = 8.64 \text{ cm}^2$

89. (d) Radius of circumcircle

$= \frac{a \times b \times c}{4 \times \Delta ABC}$

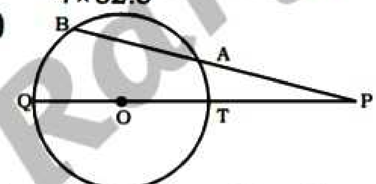
Given triangle is a right angled triangle area

$= \frac{1}{2} \times 10 \times 10.5 = 52.5 \text{ cm}^2$

Radius of circumcircle

$= \frac{(10 \times 10.5 \times 14.5)}{4 \times 52.5} = 7.25$ cm

90. (b)



Given, PA = 18cm, PB = 32cm & OP = 26cm

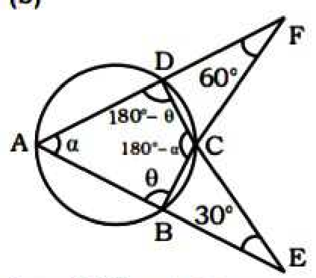
Thus, PQ = (26 + r) & PT = (26 – r)

We know, PT × PQ = PA × PB

$\Rightarrow (26 + r) \times (26 - r) = 18 \times 32$

$\Rightarrow 676 - r^2 = 576 \Rightarrow r = 10$ cm

91. (b)



In Δ ABF, $\alpha + \theta + 60^\circ = 180^\circ$

$\Rightarrow \alpha + \theta = 120^\circ$ ----(1)

In Δ ADE, $\alpha + 180^\circ - \theta + 30^\circ = 180^\circ$

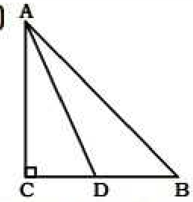
$\Rightarrow \alpha - \theta + 30^\circ = 0^\circ$ -----(2)

On solving (1) and (2), we get-

$\Rightarrow \alpha = 45^\circ$ and $\theta = 75^\circ$

$\therefore \angle ABC = 75^\circ$

92. (c)



In Δ ABC, $AB^2 = AC^2 + BC^2$

$\Rightarrow AB^2 = 5^2 + 12^2 = 169$

$\Rightarrow AB = 13$

Here, AD is angle bisector of ∠A.

So, $\frac{AC}{AB} = \frac{CD}{DB}$

$\Rightarrow \frac{5}{13} = \frac{CD}{DB}$

Let CD=5x and DB=13x

BC = CD + DB

$\Rightarrow 12 = 5x + 13x$

$\Rightarrow x = \frac{12}{18} = \frac{2}{3}$

$CD = 5x = 5 \times \frac{2}{3} = \frac{10}{3}$

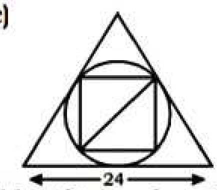
In Δ ACD, $AD^2 = CD^2 + AC^2$

$\Rightarrow AD^2 = \left(\frac{10}{3}\right)^2 + 5^2 = \frac{100}{9} + 25$

$\Rightarrow AD^2 = \frac{100 + 225}{9} = \frac{325}{9}$

$\Rightarrow AD = \frac{5\sqrt{13}}{3}$ cm

93. (c)



Side of triangle = 24 cm

In-radius of triangle

$= \frac{a}{2\sqrt{3}} = \frac{24}{2\sqrt{3}} = 4\sqrt{3}$

Diagonal of inscribed square = Diameter of the circle = $2 \times 4\sqrt{3}$

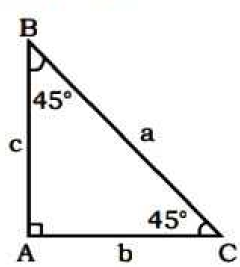
$= 8\sqrt{3}$ cm

Area of square= $\frac{(\text{diagonal})^2}{2}$

$= \frac{8\sqrt{3} \times 8\sqrt{3}}{2} = 96 \text{ cm}^2$

94. (c) Given, In right angle Δ ABC

∠A = ∠2B



Let A = 90

$\angle B = 45$

As we know,

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

$a^2 = b^2 + c^2$ ...(1)

If $\angle B = \angle C$

So, AC = AB

$\angle B = \angle C$

from equation (1)

$a^2 = b^2 + c.c$

$a^2 = b^2 + bc$

95. (d) We know,

$\angle PAQ = 90°$ [PQ is a diameter]

$\angle BAQ = 105°$ (Given)

$\angle BAP + \angle PAQ = 105°$

$\angle BAP = 15°$

As we know,

$\angle BAP = \angle AQP = 15°$ [By Alt-Seg-T]

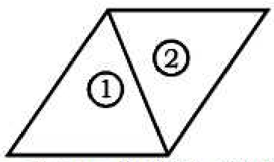
in $\angle APQ$,

$\angle APQ + \angle PAQ + \angle AQP = 180°$

$\Rightarrow \angle APQ + 90° + 15° = 180°$

$\Rightarrow \angle APQ = 75°$

96. (d)

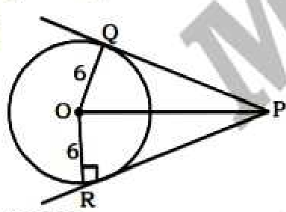


As we know, height of triangle and height of quadrilateral will be same

$\therefore$ Height of the triangle = Height of the quadrilateral

$= \frac{\sqrt{3}}{2}a = \frac{\sqrt{3}}{2} \times 10\sqrt{3} = 15$ cm

97. (d)



in ΔOQP

$(OP)^2 = (OQ)^2 + (QP)^2$

$\Rightarrow 10^2 = 62 + (QP)^2$

$\Rightarrow (QP)^2 = 64$

$\Rightarrow QP = 8$ cm

Area of $\Delta OPQ = \frac{1}{2} \times$ Base $\times$ height

$= \frac{1}{2} \times 6 \times 8 = 24$ cm

Area of quadrilateral PQOR

= 2 × Area of ΔOPQ

= 2 × 24 = 48 cm²

98. (c) Given,

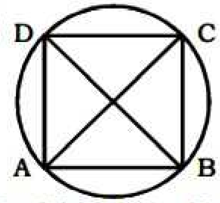
$\angle PQR = 78°$ & $\angle TPS = 24°$

We know, $\angle TPS = \frac{\angle Q - \angle R}{2}$

$\Rightarrow 78° - R = 24° \times 2$

$\Rightarrow \angle R = 30°$

99. (c)

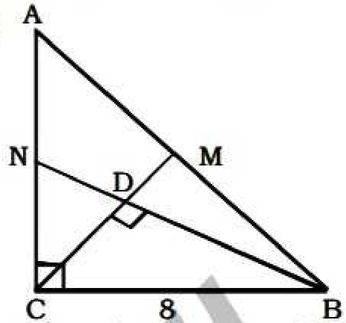


AB = 15cm, BC = 12cm, CD = 10cm

By the property, $\frac{AD}{BC} = \frac{AB}{CD}$

$\Rightarrow \frac{AD}{12} = \frac{15}{10} \Rightarrow AD = \frac{12 \times 15}{10} = 18$ cm

100. (c)



As BN and CM are medians of ΔABC, D is centroid of the traingle So, D will divide BN in the ratio 2 : 1

BD : DN = 2 : 1

$\Rightarrow BN = 3x$

Also, In right angled ΔCNB, CD is perpendicular to BN

$\Rightarrow BC^2 = BD \times BN$

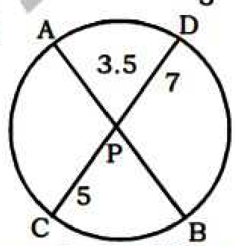
$\Rightarrow (8)^2 = 2x \times 3x$

$\Rightarrow 6x^2 = 64$

$\Rightarrow x = \frac{4\sqrt{6}}{3}$

$\therefore BN = 3x = 3 \times \frac{4\sqrt{6}}{3} = 4\sqrt{6}$ cm

101. (c)



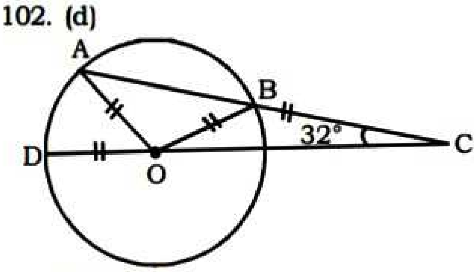
As we know, When two chords intersect each other internally-

AP × PB = PC × PD

$\Rightarrow 3.5 \times PB = 7 \times 5$

$\Rightarrow PB = 10$ cm

102. (d)



In ΔOBC

If OB = BC, then

$\angle BOC = \angle BCO = 32°$

As we know,

$\angle OBA = \angle BOC + \angle BCO = 32° + 32°$

$= 64°$

If OA = OB, then

$\angle OBA = \angle OAB = 64°$

In ΔAOB

$\angle AOB + \angle OAB + \angle OBA = 180°$

$\angle AOB + 64°\ 64° = 180°$

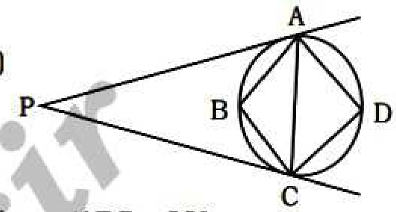
$\angle AOB = 180° - 128° = 52°$

$\angle AOD + \angle AOB + BOC = 180°$

$\angle AOD + 52° + 32° = 180°$

$\angle AOD = 180° - 84° = 96°$

103. (c)



Given $\angle ABC = 98°$

$\angle B + \angle D = 180°$

$\angle D = 180° - 98° = 82°$

$\angle PAC = \angle PCA = \angle ADC = 82°$

[Alternate segment Theorem]

In $\angle PAC$

$\angle APC + \angle PAC + \angle PCA = 180°$

$\angle APC + 82° + 82° = 180°$

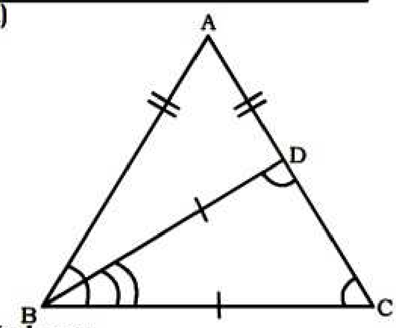
$\angle APC = 16°$

SMART APPROACH:-

$\angle APC = 180° - 2\angle ADC$

$= 180° - 2 \times 82° = 16°$

104. (d)



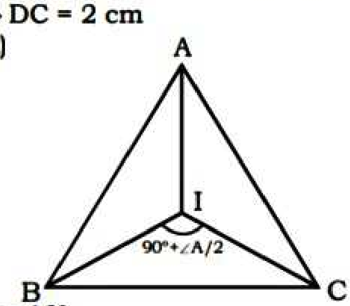
We know,

$\Delta ABC \sim \Delta BDC$

$\Rightarrow \frac{DC}{BC} = \frac{BC}{AC} \Rightarrow \frac{DC}{5} = \frac{5}{12.5}$

$\Rightarrow DC = 2$ cm

105. (a)



A = 46°

$\angle BIC = 90 + \frac{46}{2} = 113°$