Last Fight Before Exam

Geometry All IMPs

LIVE

Q. No: 1, 2, 3

40/40

CLASS 10 SSC

Board पेपर आयेगा 💯

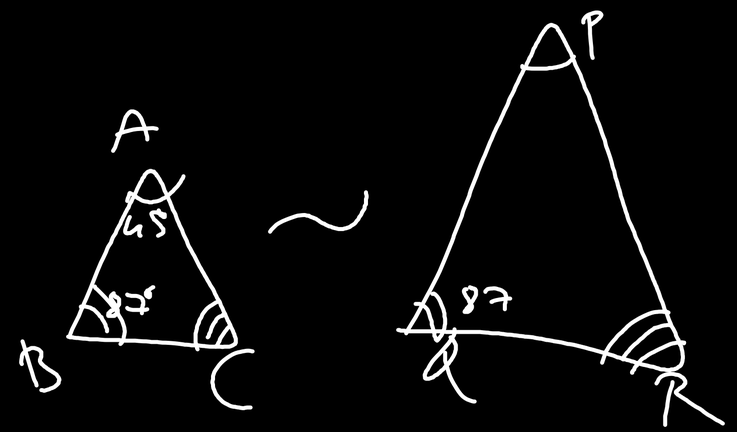
All PYQs

Q.1,2,3

Q.1) A. MCQs [each 1 mark]

1) $\Delta ABC \sim \Delta PQR$ and $\angle A = 45°$, $\angle Q = 87°$, then $\angle C =$ _____. [Nov 2020]

(A)45° (B)87° (C)48° (D)90°



$\angle C = 180 - 132$

$\angle C = 48°$

$45 + 87 + \angle C = 180$

$132 + \angle C = 180$

2) If $\Delta ABC \sim \Delta PQR$ and $4 \times A(\Delta ABC) = 25 \times A(\Delta PQR)$, then $AB : PQ$ = ? [July 2019]

(A)4:25 (B)2:5 (C)5:2 (D)25:4

$4A(\Delta ABC) = 25A(\Delta PQR)$

$\frac{A(\Delta ABC)}{A(\Delta PQR)} = \frac{25}{4}$

$\frac{AB}{PQ} = \frac{\sqrt{25}}{\sqrt{4}} = \frac{5}{2}$

5) If $\Delta ABC \sim \Delta DEF$ and $\angle A = 48°, \angle D =$ 48°, [March 2022]

(A)48° (B)83° (C)49° (D)132°

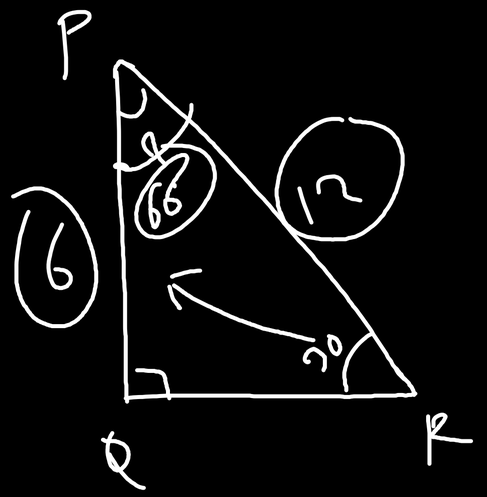
$$\frac{\sqrt{64}}{\sqrt{81}} = \frac{8}{9}$$

6) $\Delta PQR \sim \Delta STU$ and $A(\Delta PQR):A(\Delta STU)$=64:81, then what is the ratio of corresponding sides? [Aug 2022]

(A)8:9 (B)64:81 (C)9:8 (D)16:27

7) In right-angled triangle PQR, if hypotenuse PR = 12 and PQ = 6, then what is the measure of ∠ P? [July 2019]

(A) 30° (B) 60° (C) 90° (D) 45°



8) Out of the following which is a Pythagorean triplet? [March 2019]

(A) (5, 12, 14) (B) (3, 4, 2)

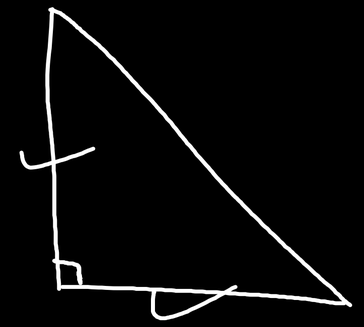
(C) (8, 15, 17) (D) (5, 5, 2)

9) In a right-angled triangle; if the sum of the squares of the sides making right angle is 169, then what is the length of hypotenuse? [Aug 2022]

(A) 15 (B) 13 (C) 5 (D) 12

$x^2 + y^2 = 169$

$\sqrt{169} = 13$

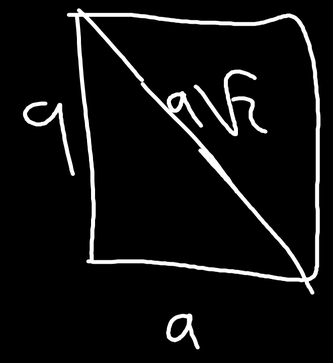


10) Find the perimeter of Square if its diagonal is 10√2 cm: [July 2023]

(A) 10 cm (B) 40√2 cm (C) 20 cm (D) 40 cm

side

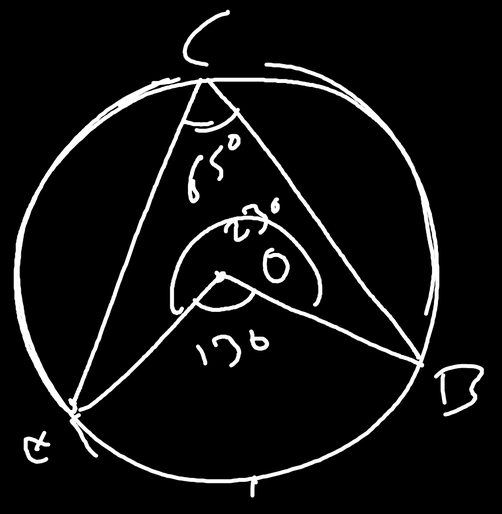
4×10



11) If a, b, c are sides of a triangle and $a^2+b^2=c^2$, name the type of triangle: [March 2023]

(A) Obtuse angle triangle (B) Acute angle triangle

(C) Right angle triangle (D) Equilateral triangle

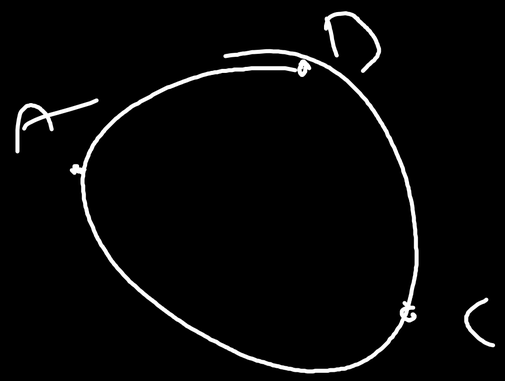


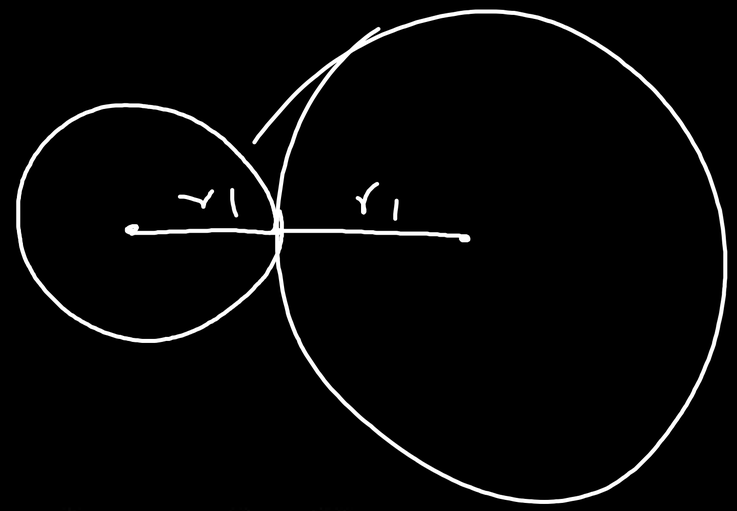
12) ∠ ACB is inscribed in arc ACB of a circle with centre O. If ∠ ACB = 65 °, find m (arc ACB): [March 2019, July 2023]

(A) 130 ° (B) 295 ° (C) 230 ° (D) 65 °

13) If the points, A, B, C are non-collinear points, then how many circles can be drawn which passes through points A, B and C? [July 2023]

(A) two (B) three (C) one (D) infinite



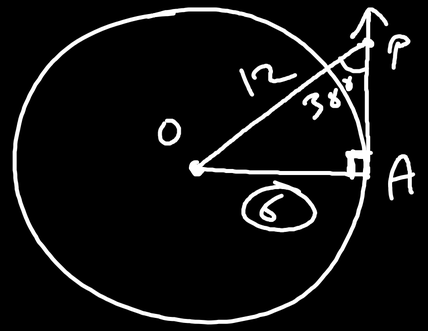


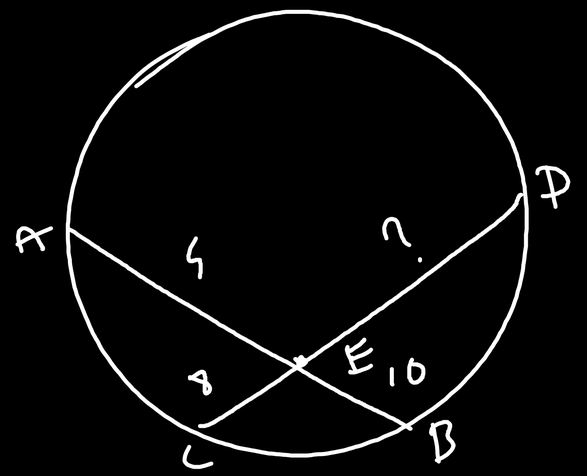
14) Two circles of radii 5.5 cm and 3.3 cm respectively touch each other externally. What is the distance between their centres? [March 2020]

(A) 4.4 cm (B) 2.2 cm (C) 8.8 cm (D) 8.9 cm

15) AP is a tangent at A drawn to the circle with centre O from an external point P. OP=12 cm and $\angle OPA$=30°, then the radius of a circle is _____. [March 2022]

(A) 12 cm (B) 6√3cm (C) 6 cm (D) 12√3 cm





16) Chords AB and CD of a circle intersect inside the circle at point E. If AE = 4, EB = 10, CE = 8, then find ED [March 2023]

(A) 7 (B) 5 (C) 8 (D) 9

$AE \times ED = CE \times ED$

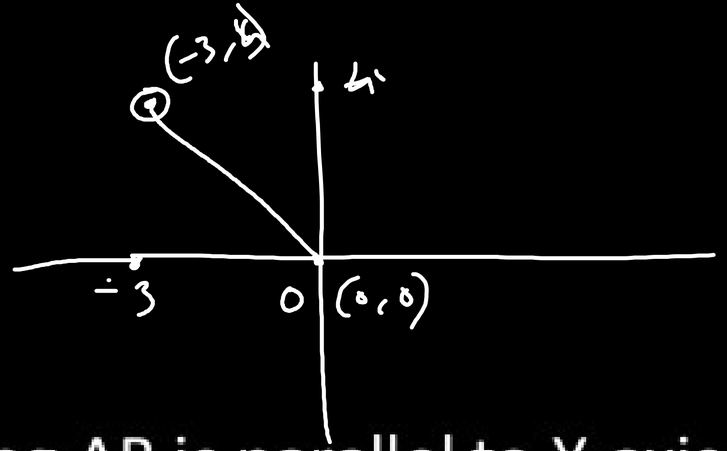
$4 \times 10 = 8 \times ED$

$8ED = 40$

$ED = \frac{40}{8} = 5$

17) Distance of point $(\underset{x}{-3}, \underset{y}{4})$ from the origin is _____. [March 2020]

(A)7 (B)1 (C)–5 (D)5



$$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

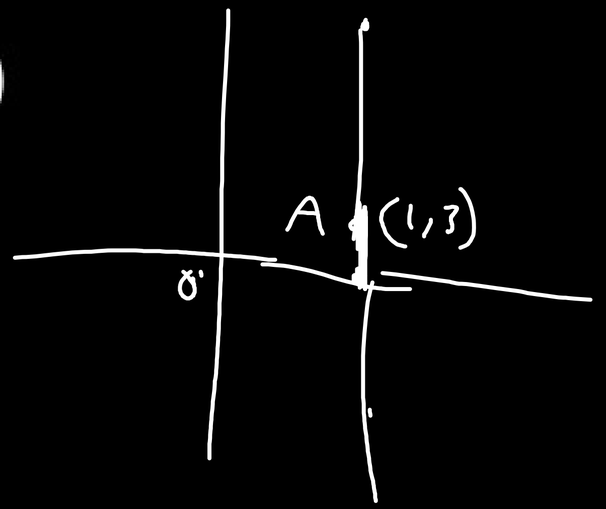
$$d = \sqrt{(0+3)^2+(0-4)^2}$$

$$d = \sqrt{3^2+(-4)^2}$$

$$d = \sqrt{9+16} = \sqrt{25} = 5$$

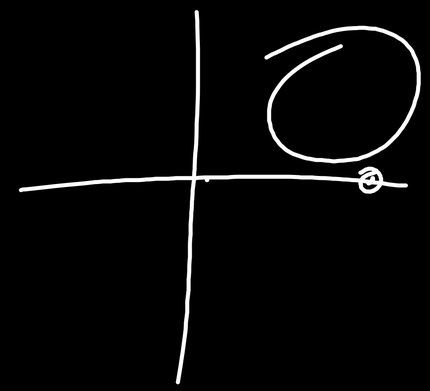
18) Seg AB is parallel to Y-axis and co-ordinates of point A are (1,3), then co ordinates of point B can be _____. [Sept 2021]

(A)(3,1) (B)(5,3) (C)(3,0) (D)(1,–3)



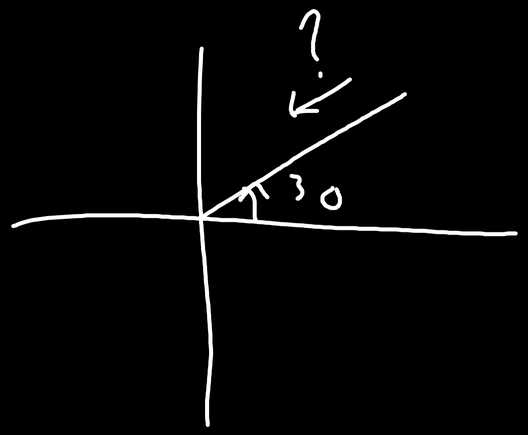
19) From the following points _____ point lies to the right side of the origin on X-axis. [Aug 2022]

(A) (−2,0) (B)(0,2) (C)(2,3) (D)(2,0)



20) line makes an angle of 30° with positive direction of X-axis, then the slope of the line is_____. [July 2023]

(A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{1}{\sqrt{3}}$ (D)√3



$m = \tan\theta$

$= \tan 30$

$=$

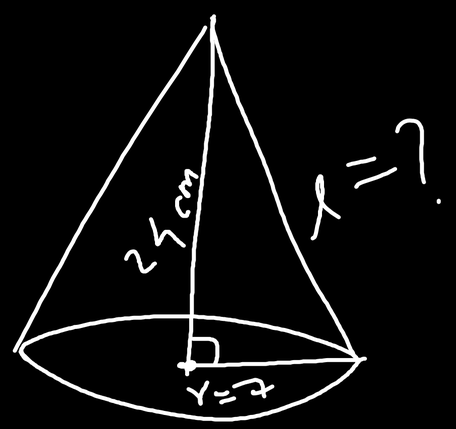
21) 1) Find the volume of a cube of side 3 cm: [March 2020]

(A) $27cm^3$ (B) 9 cm^3 (C) $81cm^3$ (D) 3 cm^3

$$l = \sqrt{r^2 + h^2}$$

$$l = \sqrt{7^2 + 24^2}$$

$$l = \sqrt{49 + 576}$$



22) If radius of the base of cone is 7 cm and height is 24 cm, then find its slant height: [March 2023]

(A) 23 cm (B) 26 cm (C) 31 cm (D) 25 cm

$$l = \sqrt{625}$$

$$l = 25$$

Q.1. B) Solve the following [each 1 mark]

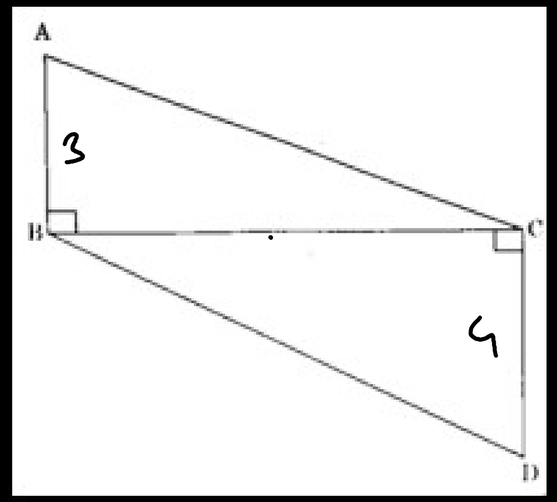
1) If $\Delta ABC \sim \Delta PQR$ and $\angle A = 60°$, then $\angle P$ =? [March 2019]

$\angle P = 60°$

2) The ratio of corresponding sides of similar triangles is 3:5, then find the ratio of their areas. [March 2020]

$$\frac{3^2}{5^2} = \frac{9}{25}$$

3) In the figure, $seg\ AB \perp seg\ BC$, $seg\ DC \perp seg\ BC$, If AB= 3 and DC= 4, then find $\frac{A(\Delta ABC)}{A(\Delta DCB)}$ =?

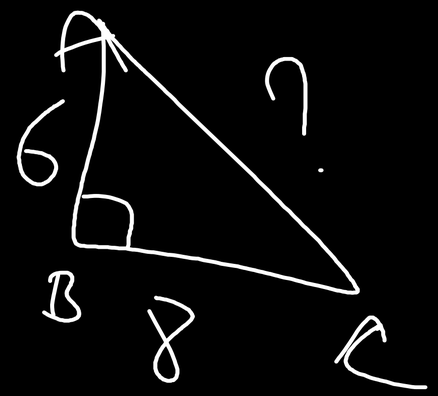


[Nov 2020, Sept 2021]

4) If $\Delta ABC \sim \Delta PQR$ and $A(\Delta ABC) : A(\Delta PQR)$ =16:25 , then find $AB:PQ$

[March 2023]

5) In right-angled Δ ABC, if ∠ B = 90 °, AB = 6, BC = 8, then find AC. [March 2019]



∴ AC = 10 unit

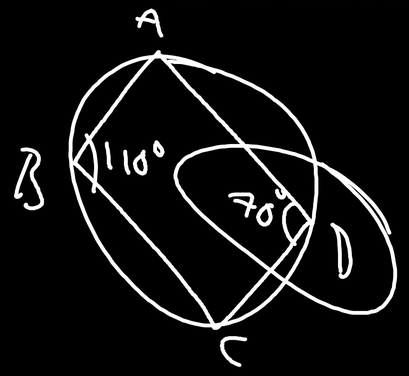
6) Find the diagonal of a square whose side is 10 cm. [March 2020]

$10\sqrt{2}$

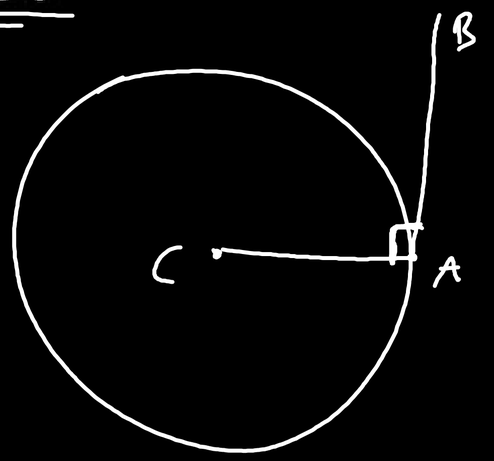
7) In ΔRST, $\angle S = 90°$, $\angle T = 30°$, RT = 12 cm, then find RS [March 2023]

$\therefore RS = 6\ cm$

8) $\square ABCD$ is cyclic. If $\angle$ B = 110 °, then find measure of $\angle$ D. [March 2020]

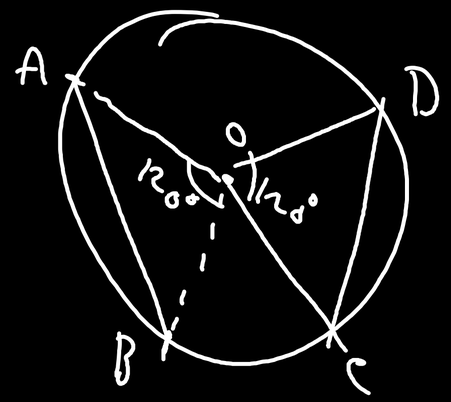


9) Radius of the circle with centre C is 6 cm. Line AB is tangent at point A. What is the measure of $\angle CAB$? [Sept 2021]

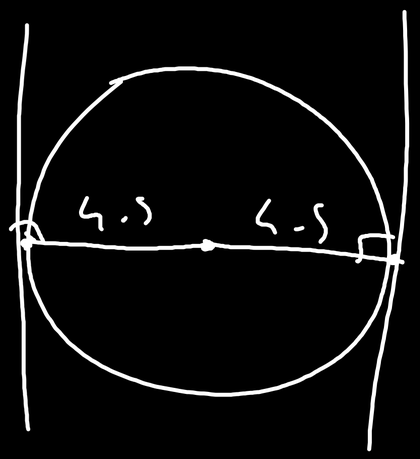


$\angle CAB = 90^\circ$

10) Chord AB and Chord CD of a circle with centre O are congruent. If $m(arc\ AB)$ = 120°, then find the $m(arc\ CD)$ [March 2022]



11) What is the distance between two parallel tangents of a circle having radius 4.5 cm. [July 2023]



$d = 9\,cm$

(x, y)

12) Find the slope of the line passing through the points A(2, 3) and B(4, 7) [March 2020]

x_1, y_1 x_2, y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

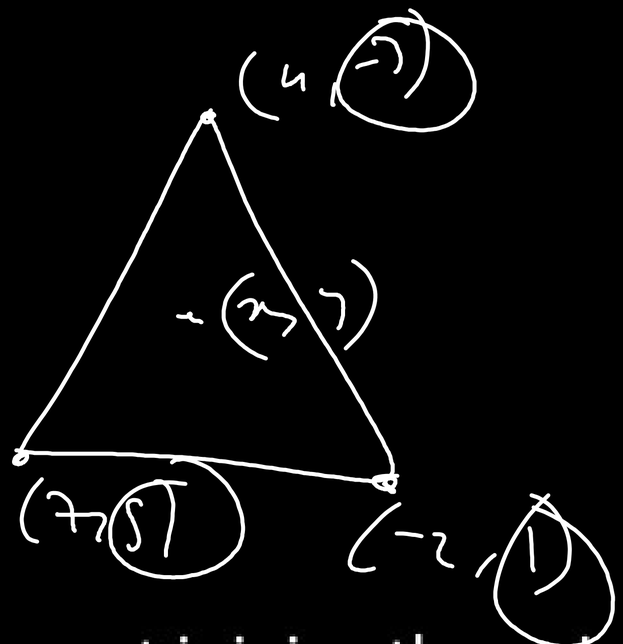
$m = 2$

13) Find the y co-ordinate of the centroid of a triangle whose vertices are (4, −3), (7,5)*and* (−2,1). [March 2022]

Centroid formula,

$$(x, y) = \left[\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right]$$

$y = 1$



14) Find the co-ordinates of the mid-point of the segment joining the points $A(4, 6)$ *and* $B(-2, 2)$ [July 2023]

Midpoint formula

$$x = \frac{x_1+x_2}{2}, \quad y = \frac{y_1+y_2}{2}$$

$(x, y) = (1, 4)$

15) Find the value of $sin\ 30° + cos\ 60°$. [March 2022]

$\frac{1}{2} + \frac{1}{2}$

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

16) If $3\ sin\ \theta = 4\ cos\ \theta$, then find the value of $tan\ \theta$. [Nov 2020]

$\frac{\sin\theta}{\cos\theta} = \frac{4}{3}$

$\therefore \tan\theta = \frac{4}{3}$

17) If $\sin\theta = \cos\theta$, then what will be the measure of angle θ. [March 2022]

$\theta = 45^\circ$

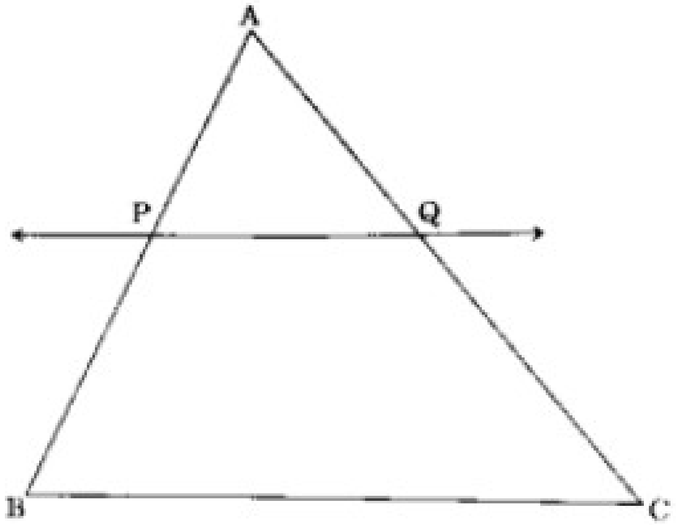
18) If the side of a cube is $5cm$, then find its volume. [July2019]

$125\ cm^3$

Q.2) A. Activity [each 2 marks]

1)

[Sept 2021]



In Δ ABC, line PQ ∥ side BC. If AP = 10, PB = 12, AQ = 15, then complete the following activity to find the value of QC.

Activity : In Δ ABC, line PQ ∥ side BC ..... (given)

∴ $\frac{AP}{PB} = \frac{AQ}{QC}$ ..... (BPT)

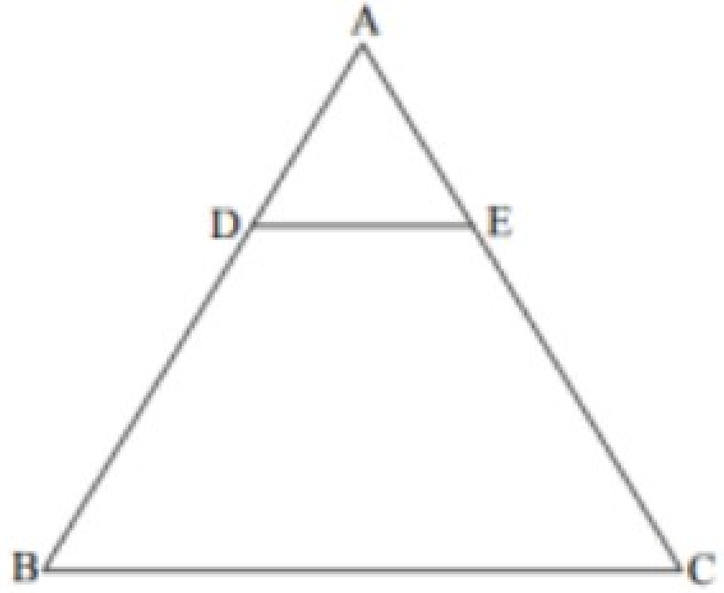
∴ $\frac{10}{12} = \frac{15}{QC}$

∴ $QC = \frac{15 \times 12}{10}$

∴ QC = 18 unit

18 unit

2)



In ΔABC, seg DE $\parallel$ side BC. If AD = 6 cm, DB = 9 cm, EC = 7.5 cm, then complete the following activity to find AE.

Activity: In ΔABC, seg DE $\parallel$ side BC ..... (given)

$\therefore \quad \frac{AD}{DB} = \frac{AE}{EC}$ ..... $\square$

$\therefore \quad \frac{6}{9} = \frac{AE}{\square}$

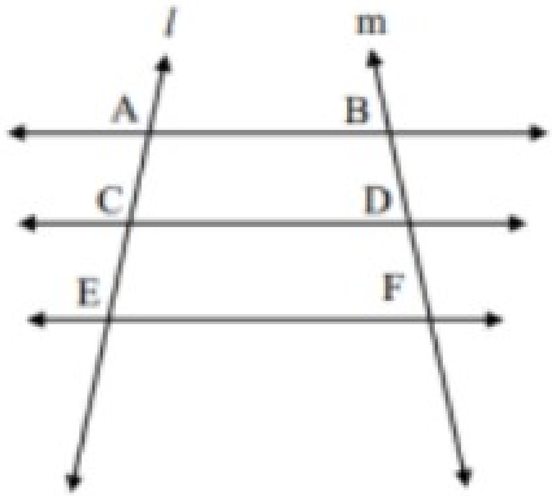
$\therefore \quad AE = \frac{6 \times 7.5}{\square}$

$\therefore \quad AE = \square$

[March 2020, Nov 2020]

3)

[July 2019]



In the above figure, line AB || line CD || line EF , line *l* and line *m* are its transversals. If AC = 6, CE = 9. BD = 8, then complete the following activity to find DF.

Activity:

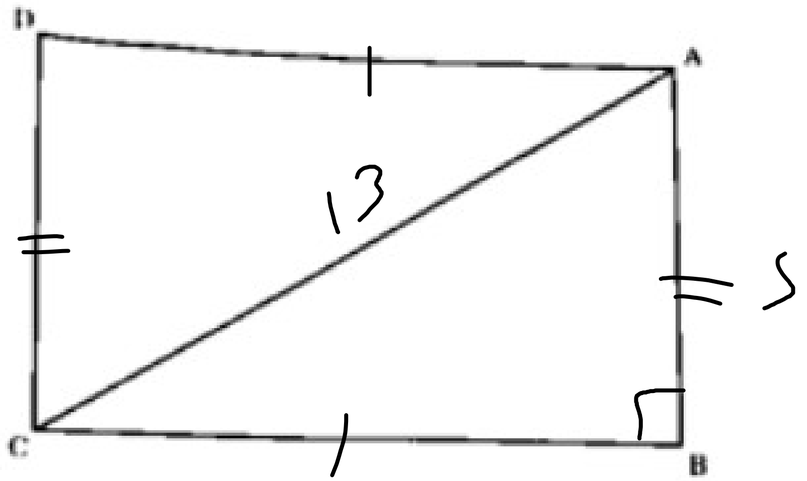
$\frac{AC}{CE} = \frac{BD}{DF}$ (Property of three parallel lines and their transversal)

$\frac{6}{9} = \frac{8}{DF}$

$DF = \frac{8 \times 9}{6} = 12$

4)

[March 2022]



In the above figure, $\square$ ABCD is a rectangle. If AB = 5, AC = 13, then complete the following activity to find BC.

Activity :

right-angled

Δ ABC is $\llcorner$ triangle.

$\therefore$ By Pythagoras theorem

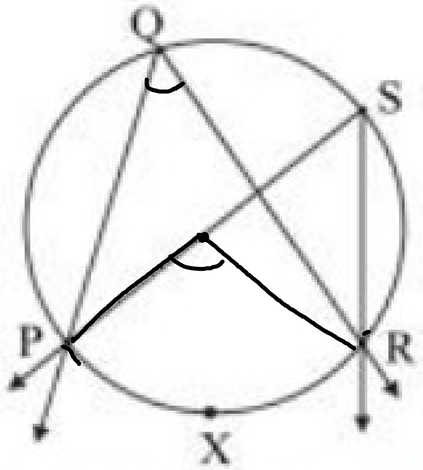
$AB^2 + BC^2 = AC^2$

$\therefore$ $25 + BC^2 = 169$

$\therefore$ $BC^2 = 144$

$\therefore$ $BC = 12$

5) [March 2019]



Prove that, angles inscribed in the same arc are congruent.

Given: ∠PQR and ∠PSR are inscribed in the same arc.
Arc PXR is intercepted by the angles.

To prove: ∠PQR ≅ ∠PSR

Proof:

$m\angle PQR = \frac{1}{2} m(\text{arc } PXR)$ …(i) Inscribed angle thm.

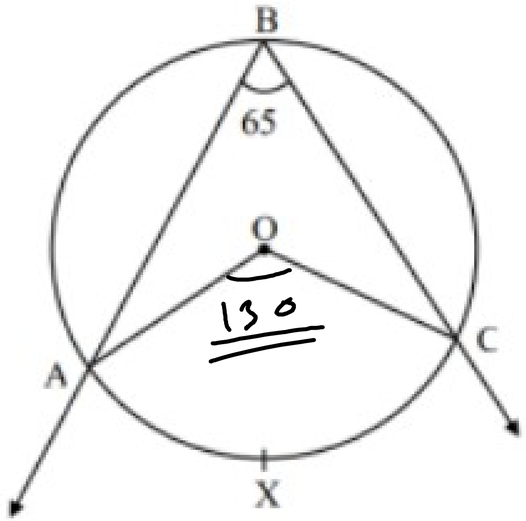
$m\angle PSR = \frac{1}{2} m(\text{arc } PXR)$ …(ii) —11—

$\therefore\ m\angle PQS = m\angle PSR$ …[From (i) and (ii)]

$\therefore\ \angle PQR \cong \angle PSR$ …(Angles equal in measure are congruent)

6) July 2019]

In the following figure, O is the centre of the circle. ∠ ABC is inscribed in arc ABC ∠ ABC = 65°. Complete the following activity to find the measure of ∠ AOC.



(an arc)

∠ ABC = $\frac{1}{2}$ m ☐ (Inscribed angle theorem)

65 × 2 = m(arc AXC)

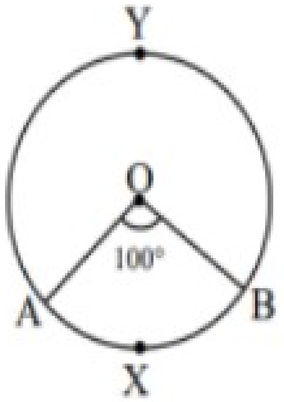
m(arc AXC) = 130°

∠ AOC = m(arc AXC) (Definition of measure of an arc)

∠ AOC = 130°

7)

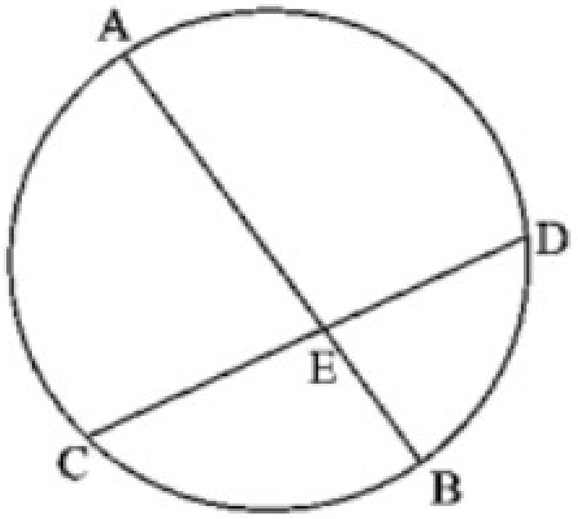
[March 2020]



In the figure given above, O is the centre of the circle. Using given information complete the following table:

Type of arc	Name of the arc	Measure of the arc
Minor arc	AXB	100°
Major arc	ATB	260°

8) [Nov 2020]



In the above figure, chord AB and chord CD intersect each other at point E. If AE = 15, EB = 6, CE = 12, then complete the activity to find ED.

Activity:

Chord AB and chord CD intersect each other at point E ..... (given)

∴ CE × ED = AE × EB ..... [ ] → Th^m of internal div. of chords.

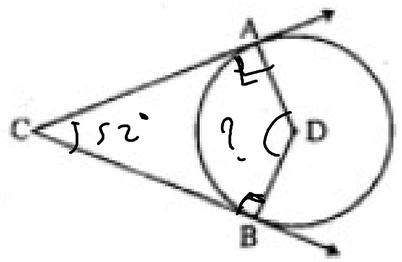
∴ [12] × ED = 15 × 6

∴ $ED = \frac{[90]}{12} = \frac{15}{2}$

∴ ED = [7.5 cm]

9)

[July 2023]



In the above figure, circle with centre D touches the sides of ∠ACB at A and B. If ∠ACB = 52°, complete the activity to find the measure of ∠ADB.

Activity :

In □ ABCD,

∠CAD = ∠CBD = 90° ..... Tangent theorem

∴ ∠ACB + ∠CAD + ∠CBD + ∠ADB = 360°

∴ 52° + 90° + 90° + ∠ADB = 360°

∴ ∠ADB + 232° = 360°

∠ADB = 360° − 232°

∴ ∠ADB = 128°

10) If C(3, 5) and D(–2, –3), then complete the following activity to find the distance between points C and D.

[Nov 2020]

Activity:

Let C(3, 5) $\equiv (x_1, y_1)$, D(–2, –3) $\equiv (x_2, y_2)$

$$CD = \sqrt{(x_2 - \boxed{x_1})^2 + (y_2 - y_1)^2} \quad \ldots\ldots \text{(formula)}$$

$$\therefore \quad CD = \sqrt{(-2 - \boxed{3})^2 + (-3 - 5)^2}$$

$$\therefore \quad CD = \sqrt{\boxed{25} + 64}$$

$$\therefore \quad CD = \sqrt{\boxed{89}}$$

11) [Sept 2021]

(iii) To find the distance between the points P(6, –6) and Q(3, –7 complete the following activity.

Activity :

Let P(6, –6) = (x_1, y_1), Q(3, –7) = (x_2, y_2)

By distance formula,

$$d(P, Q) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(3 - 6)^2 + (-7 - \boxed{(-6)})^2}$$

$-7+6$

$$= \sqrt{(\boxed{-3})^2 + (-1)^2}$$

$$= \sqrt{\boxed{9} + 1}$$

$\therefore$ $$d(P, Q) = \sqrt{\boxed{10}}$$

12) If $\sec\theta = \frac{25}{7}$, find the value of $\tan\theta$. [March 2020]

Solution:

$$1 + \tan^2\theta = \sec^2\theta$$

$$\therefore \quad 1 + \tan^2\theta = \left(\frac{25}{7}\right)^2$$

$$\therefore \quad \tan^2\theta = \frac{625}{49} - 1$$

$$= \frac{625 - 49}{49}$$

$$\tan^2\theta = \frac{576}{49}$$

$$\therefore \quad \tan\theta = \frac{24}{7} \qquad \ldots\text{(by taking square roots)}$$

13) Complete the following activity to prove :

$$\cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta$$

Activity :

L.H.S. $= \cot\theta + \tan\theta$

$= \dfrac{\cos\theta}{\sin\theta} + \dfrac{\boxed{\sin\theta}}{\cos\theta}$

$= \dfrac{\boxed{\cos^2\theta} + \sin^2\theta}{\sin\theta \times \cos\theta}$

$= \dfrac{1}{\sin\theta \times \cos\theta}$ ..... $\because$ $\boxed{\quad}$ $(\because \sin^2\theta + \cos^2\theta = 1)$

$= \dfrac{1}{\sin\theta} \times \dfrac{1}{\cos\theta}$

$= \boxed{\quad} \times \sec\theta$ ($\operatorname{cosec}\theta$)

$\therefore$ L.H.S. = R.H.S.

[March 2022]

14)

[March 2023]

4) Show that, $\cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta$

Solution :

L.H.S. $= \cot\theta + \tan\theta$

$$= \frac{\cos\theta}{\sin\theta} + \frac{\sin\theta}{\cos\theta}$$

$$= \frac{\square + \square}{\sin\theta \times \cos\theta}$$

$$= \frac{1}{\sin\theta \times \cos\theta}$$

$$= \frac{1}{\sin\theta} \times \frac{1}{\square}$$

$$= \operatorname{cosec}\theta \times \sec\theta$$

L.H.S. = R.H.S.

$\therefore \quad \cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta.$

15) Complete the following activity to prove $\cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta$.

[July 2023]

Activity :

L.H.S. $= \cot\theta + \tan\theta$

$= \dfrac{\square}{\sin\theta} + \dfrac{\sin\theta}{\cos\theta}$

$= \dfrac{\square + \square}{\sin\theta \cdot \cos\theta}$

$= \dfrac{1}{\sin\theta \cdot \cos\theta}$ $(\because \sin^2\theta + \cos^2\theta = 1)$

$= \dfrac{1}{\sin\theta} \times \dfrac{1}{\cos\theta}$

$= \square \times \sec\theta$

$\therefore$ L.H.S. = R.H.S.

$\therefore \cot\theta + \tan\theta = \operatorname{cosec}\theta \times \sec\theta$

16) How many solid cylinders of radius 6 cm and height 12 cm ca

be made by melting a solid sphere of radius 18 cm ?

[March 2019]

Activity : Radius of the sphere, $r = 18$ cm

For cylinder, radius $R = 6$ cm, height $H = 12$ cm

Number of cylinders can be made $= \dfrac{\text{Volume of the sphere}}{\text{V. of cylinder}}$

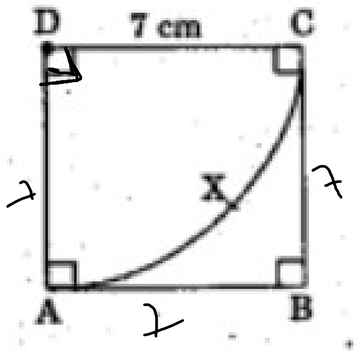
$= \dfrac{\frac{4}{3}\pi r^3}{\pi r^2 h}$ $\quad \frac{4}{3}\pi r^3$

$= \dfrac{\frac{4}{3} \times 18 \times 18 \times 18}{6 \times 6 \times 12}$

$= 18$

17)

[July 2023]



In the above figure, side of square ABCD is 7 cm with

D and radius DA sector D–AXC is drawn.

Complete the following activity to find the area of squ

ABCD and sector D–AXC.

Activity :

Area of square = $\square$ ..... formula

$= (7)^2$

$= 49 \text{ cm}^2$

Area of sector (D–AXC) = $\frac{\theta}{360} \times \pi r^2$ ..... formula

$= \frac{90^\circ}{360} \times \frac{22}{7} \times 7 \times 7$

$= 38.5 \text{ cm}^2$

18) Find the surface area of a sphere of radius 7 cm. [March 2023]

Solution :

Surface area of sphere $= 4\pi r^2$

$= 4 \times \frac{22}{7} \times 7^2$

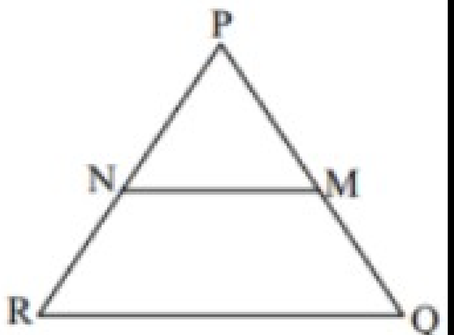
$= 4 \times \frac{22}{7} \times 49$ 7

$= 88 \times 7$

$\therefore$ Surface area of sphere $= 616$ sq.cm.

Q.2) B. Solve [each 2 marks]

1) In $\Delta PQR, NM \parallel RQ$. If PM=15, $MQ = 10, NR = 8$, *then find PN.*



[March 2020]

In ΔPQR . $NM \parallel RQ$.

$\therefore$ By BPT

$\therefore \frac{PN}{NR} = \frac{PM}{MQ}$

$\therefore \frac{PN}{8} = \frac{15}{10}$

$\therefore$ PN = 12 units

2) If $\Delta ABC \sim \Delta DEF$, then write the corresponding congruent angles and also write the ratio of corresponding sides. [July 2019]

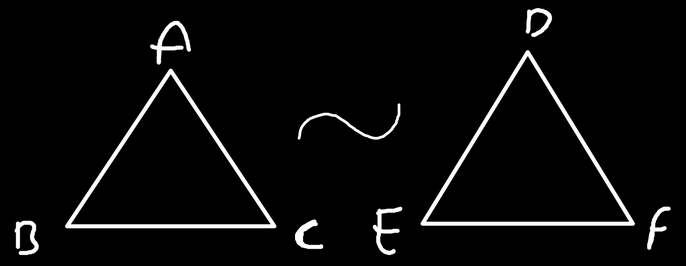
$\Delta ABC \sim \Delta DEF$

$\therefore \angle A \cong \angle D$

$\therefore \angle B \cong \angle E$

$\therefore \angle C \cong \angle F$

} ... (C.a.s.t)



$\therefore \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$ .... (ratio of corresponding Sides)

3) $\Delta ABC \sim \Delta PQR$, A(ΔABC) = 81 $cm2$, A(ΔPQR) = 121 $cm2$. If BC = 6.3 cm, then find QR [Nov 2020]

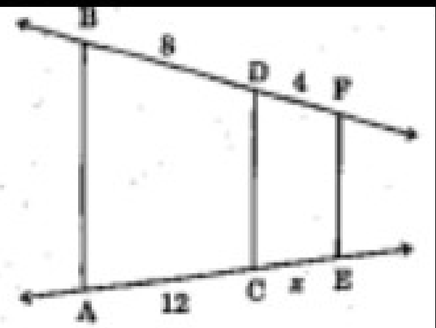
$$\frac{A(\Delta ABC)}{A(\Delta PQR)} = \frac{BC^2}{QR^2}$$

$$\frac{81}{121} = \frac{(6.3)^2}{QR^2}$$

$$\frac{9}{11} = \frac{6.3}{QR}$$

$$\therefore QR = 7.7 \text{ cm}$$

4) In the above figure, if $AB \| CD \| EF$, then find x and AE by using given information.



[July 2023]

$AB \| CD \| EF$

Given : $BD = 8$, $DF = 4$, $AC = 12$, $CE = x$

$\therefore$ By property of three parallel lines

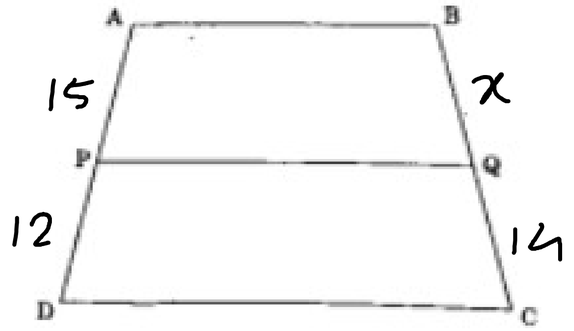
$$\frac{BD}{DF} = \frac{AC}{CE}$$

$$\frac{8}{4} = \frac{12}{x}$$

$$x = \frac{12 \times 4}{8}$$

$\therefore \boxed{x = 6 \text{ units}}$

5) In trapezium ABCD side AB || side PQ || side DC. AP = 15, PD = 12, QC = 14, find BQ.



[March 2023]

$$\frac{AP}{PD} = \frac{BQ}{QC}$$

$$\frac{15}{12} = \frac{x}{14}$$

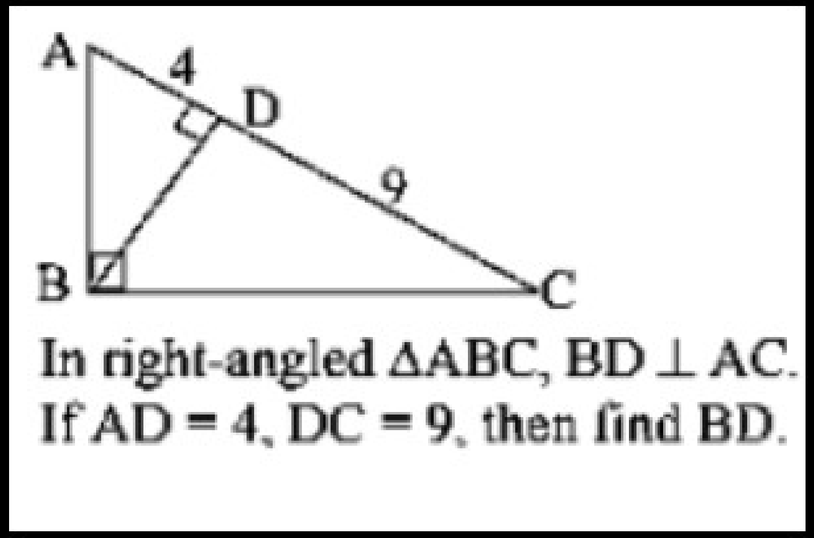
$$12x = 15 \times 14$$

$$x = \frac{15 \times 14}{12}$$

$$x = \frac{15 \times 7}{6}$$

$x = 17.5$ units

6)



In right-angled ΔABC, $BD \perp AC$.
If $AD = 4$, $DC = 9$, then find BD.

[March 2019]

$BD^2 = AD \times DC$

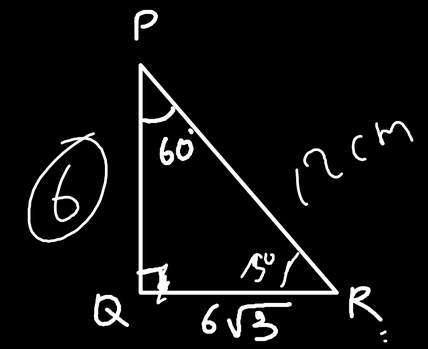
$BD^2 = 4 \times 9$

$BD = \sqrt{4 \times 9}$

$BD = 2 \times 3$

$\therefore BD = 6$ units

7) In ΔPQR, ∠P = 60°, ∠Q = 90° and QR = 6√3 cm, then find the values of PR and PQ. [Nov 2020]



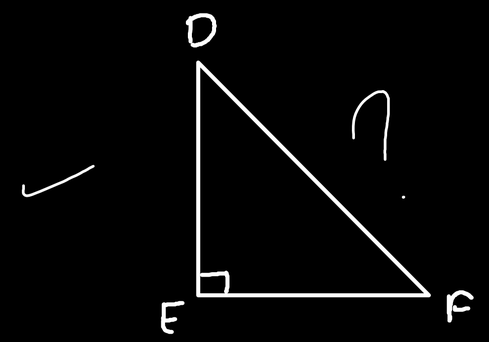
$$QR = \frac{\sqrt{3}}{2} \times PR$$

$$6\sqrt{3} = \frac{\sqrt{3}}{2} \times PR$$

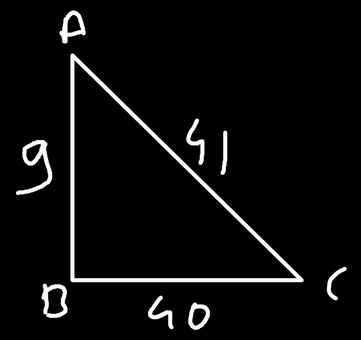
$$PR = \frac{6\sqrt{3} \times 2}{\sqrt{3}}$$

$$\therefore \boxed{PR = 12 \text{ cm}}$$

8) In ΔDEF, $\angle E = 90°$. If $DE = 33\ cm$, $DF = 65\ cm$, then find EF. [Sept 2021]



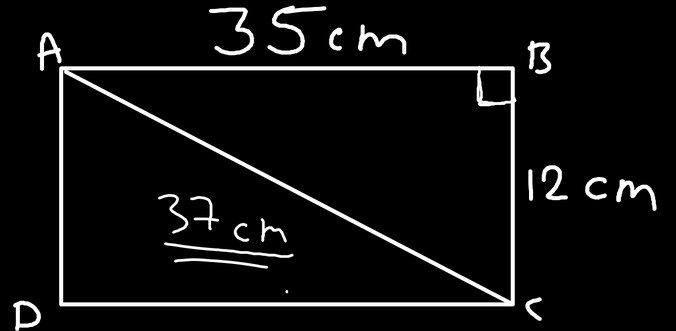
9) In ΔABC, $AB = 9cm$, $BC = 40cm$, $AC = 41cm$. State whether ΔABC is a right-angled triangle or not? Write reason. [March 2022]



$\angle$

right-angled Δ

10) Find the length of the diagonal of a rectangle whose length is 35 cm and breadth is 12 cm. [March 2023]

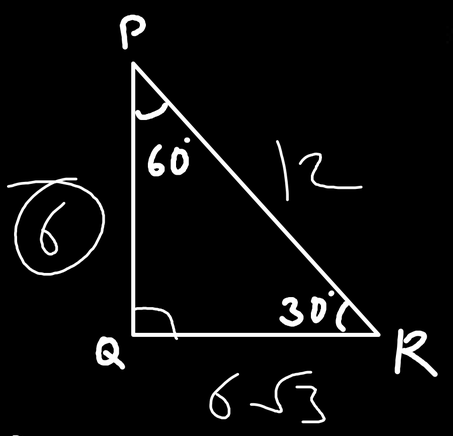


by Pythagoras th^m.

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

$AC = 37$ cm

11) In right-angled triangle PQR, if $\angle P = 60°$, $\angle R = 30°$ and PR=12, then find the values of PQ and QR. [March 2019]



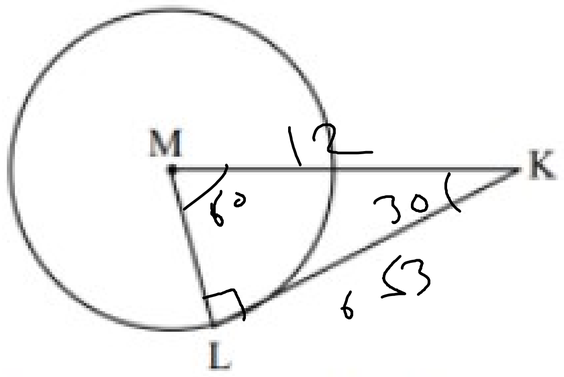
$PQ = \frac{1}{2} \times PR$

$QR = \frac{\sqrt{3}}{2} \times 12 = 6\sqrt{3}$

$PQ = \frac{1}{2} \times 12$

$PQ = 6$

11) [March 2020]



In the figure given above, M is the centre of the circle and seg KL is a tangent segment. L is point of contact. If MK = 12, KL = $6\sqrt{3}$, then find the radius of the circle.

M is the center of the circle and Seg KL is tangent Segment, L is the point of contact.

$\therefore \angle L = 90^\circ$ ——— (By tangent theorem)

$\therefore \angle M = 60^\circ$

$\therefore \angle K = 30^\circ$

$\tan K = \frac{\sqrt{3}}{2}$ ×12 6

$KL = 6\sqrt{3}$

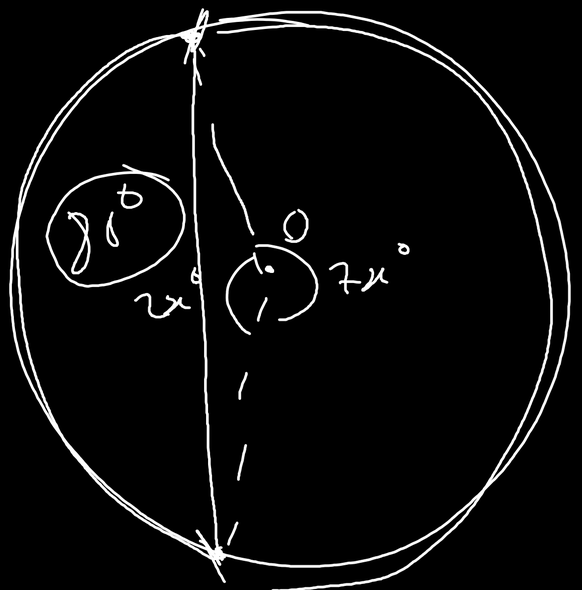
$\therefore$ By $30^\circ - 60^\circ - 90^\circ$ property

$\therefore ML = \frac{1}{2} MK$

$\therefore ML = \frac{1}{2} \times 12$

$\therefore \boxed{ML = 6 \text{ units}}$

12) Measure of two arcs formed by a chord of a circle are $2x°$ and $7x°$. Find the mesaure of minor arc. [Sept 2021]



$2x° + 7x° = 360°$

$9x° = 360°$

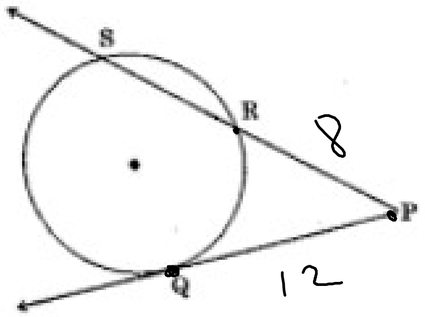
$x = \frac{360°}{9}$

$x = 40°$

$2x = 2 \times 40$

$= 80°$

13) In the above figure, ray PQ touches the circle at point Q. If PQ=12, PR=8, Find the length of seg PS



[July 2023]

Ray PQ touches the circle at point Q.

∴ By theorem of external division of chords

$$\therefore \quad PQ^2 = PS \times PR$$

$$(12)^2 = PS \times 8$$

$$\therefore PS = \frac{144}{8}$$

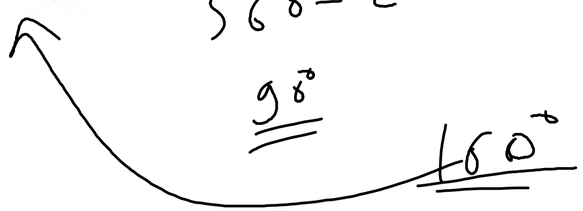
$$\therefore \boxed{PS = 18 \text{ units}}$$

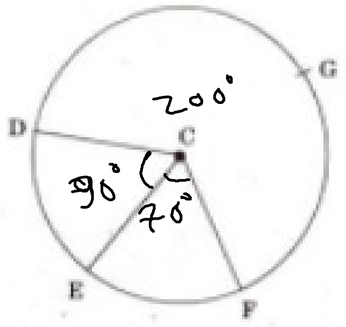
14)

In the given figure points G, D, E, F are points of a circle with centre C, $\angle ECF = 70°$, $m\ (arc\ DGF) = 200°$. Find

(i) m (arc DE)

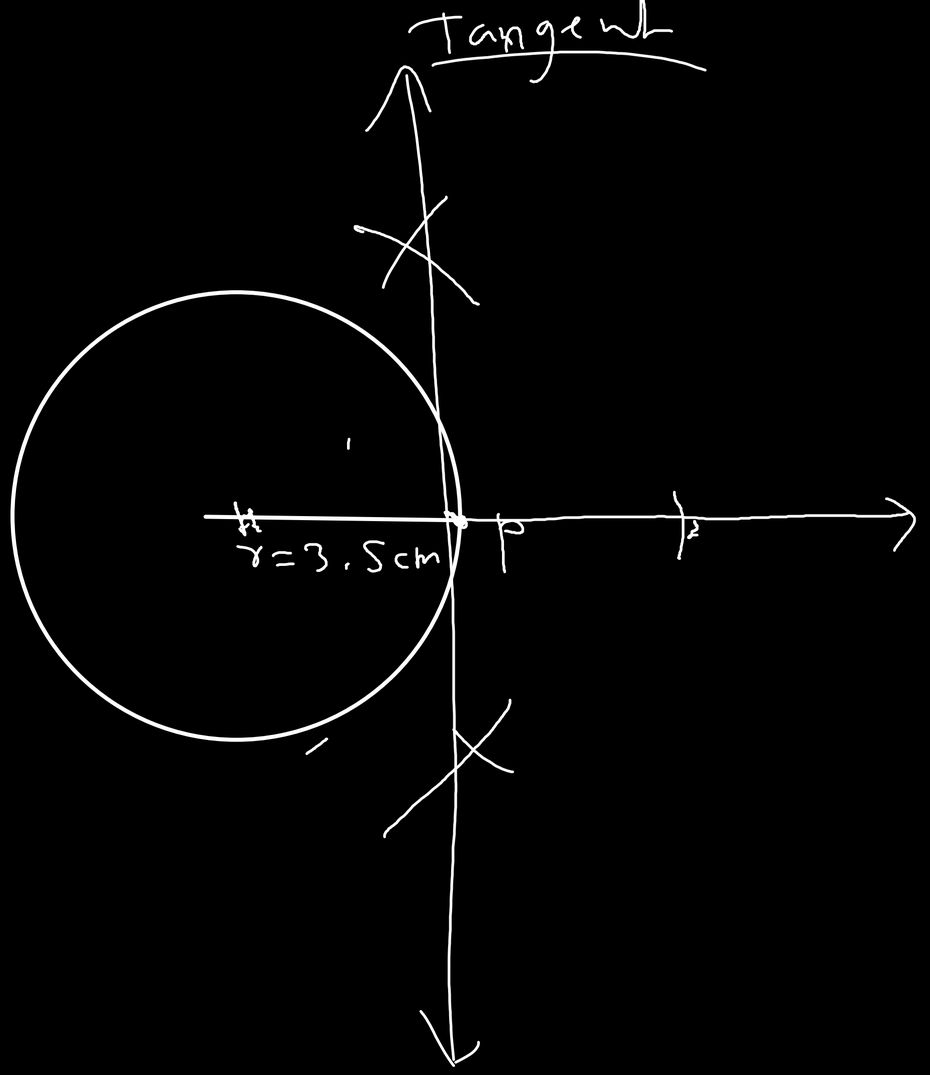
(ii) m (arc DEF).





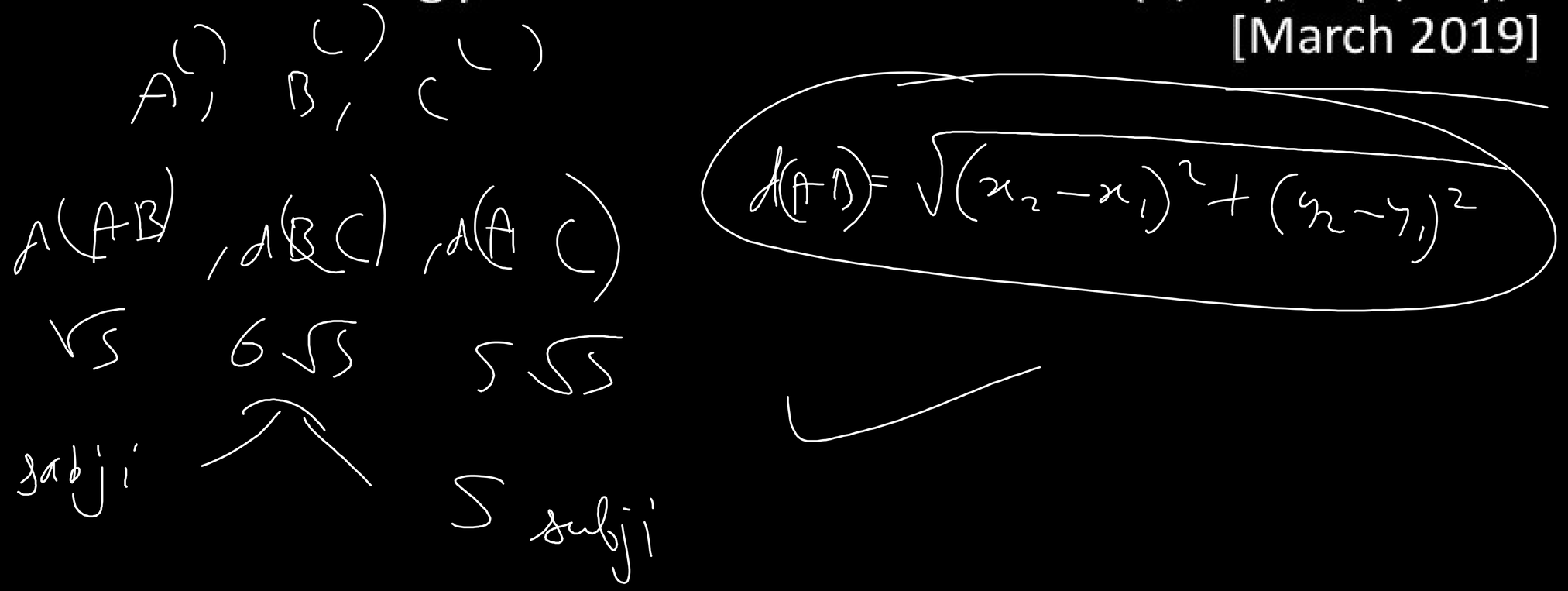
[March 2023]

15) Construct a tangent to a circle with centre O and radius 3.5 cm at a point P on it. [July 2019]



16) Draw a circle of radius 3.2 cm and centre ‘O’. Take any point P on it. Draw tangent to the circle through point P using the centre of the circle. [March 2022]

17) Verify whether the following points are collinear or not: A (1, –3), B (2, –5), C (–4, 7) [March 2019]



18) Find the co-ordinates of the centroid of the Δ PQR, whose vertices are P(3, –5), Q(4, 3) and R(11, –4) [July 2019]

Soln: (1)

$(x, y) = (6, -2)$ (2)

19) Find the slope of a line passing through the points A(2, 5) and B(4, –1) [Nov 2020]

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\therefore \boxed{m = -3}$$

20) Find slope of the line EF, where the co-ordinates of E are (−4, −2) and coordinates of F are (6,3) [July 2023]

21) If $sec\theta = \frac{25}{7}$ then find the value of tan θ. [March 2019]

$\sec\theta = \frac{25}{7}$

w. k. t.

$1 + \tan^2\theta = \sec^2\theta$

$\tan^2\theta = \sec^2\theta - 1$

$\tan^2\theta = \left(\frac{25}{7}\right)^2 - 1$

$\tan^2\theta = \frac{625}{49} - 1$

$\tan^2\theta = \frac{625-49}{49}$

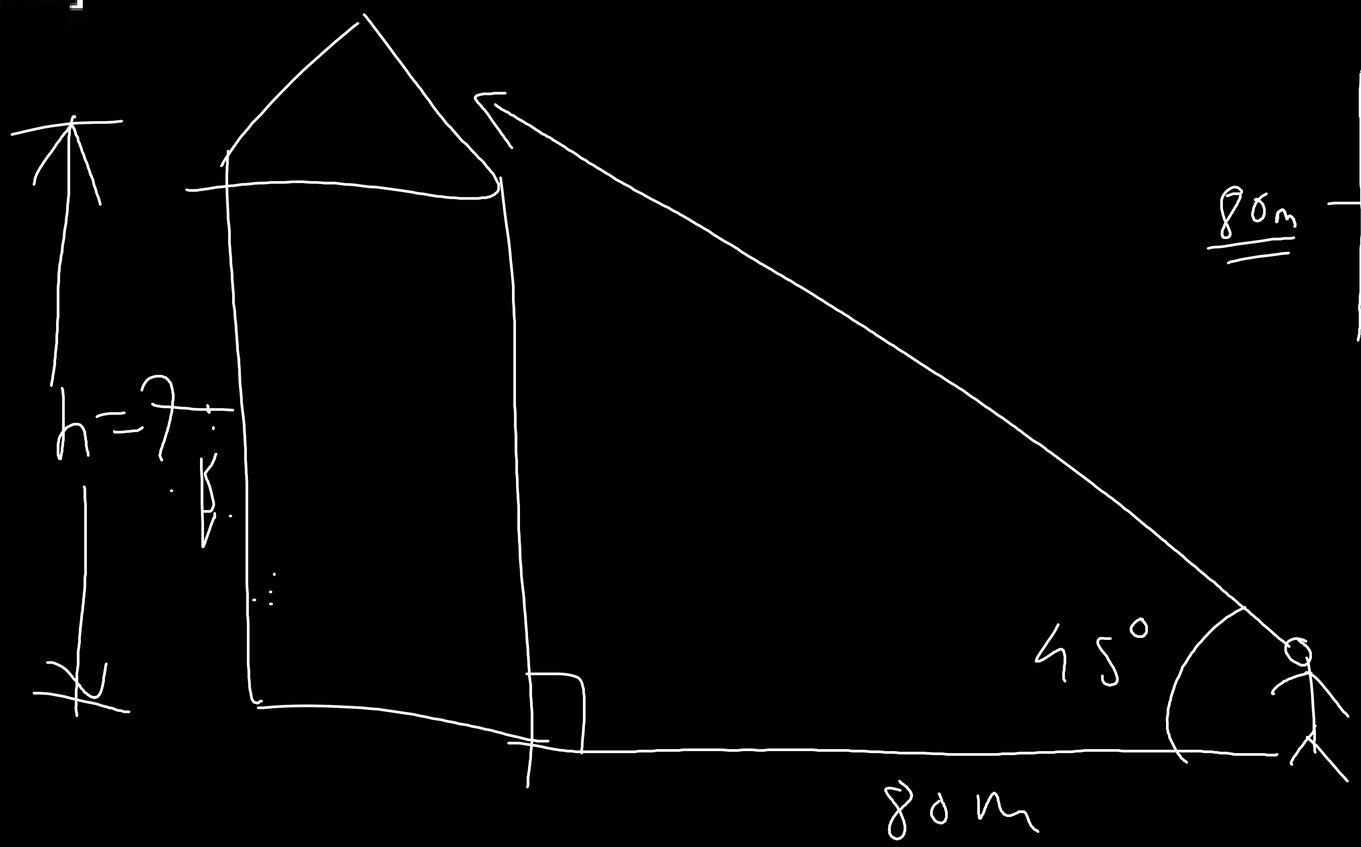
$\tan^2\theta = \frac{576}{49}$

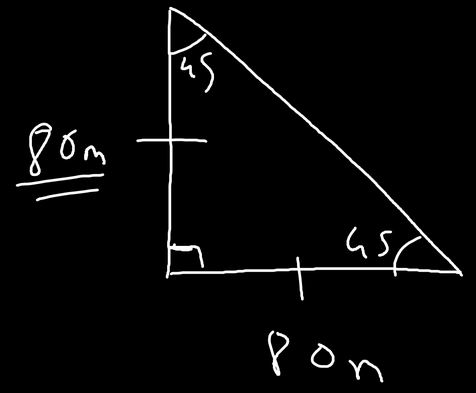
$\tan\theta = \sqrt{\frac{576}{49}}$

$\therefore \tan\theta = \frac{24}{7}$

22) A person is standing at a distance of 80 metres from a Church and looking at its top. The angle of elevation is of 45□. Find the height of the Church.

[March 2020]





$$\tan\theta = \frac{h}{80}$$

$$\tan 45^\circ = \frac{h}{80}$$

$$1 = \frac{h}{80}$$

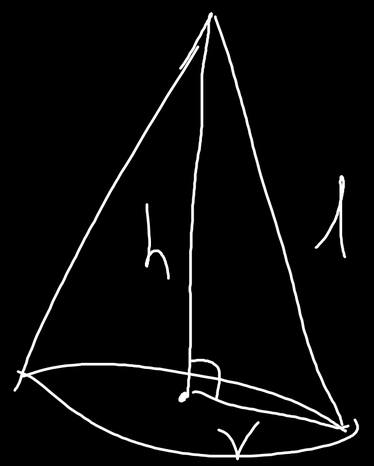
$$\therefore h = 80\,m$$

23) If $\sin\theta = \frac{11}{61}$, then find the value of $\cos\theta$ using trigonometric identity. [March 2022]

$$\cos\theta = \frac{60}{61}$$

24) In a right circular cone, if perpendicular height is 12 cm and radius is 5 cm, find its slant height. [March 2019]

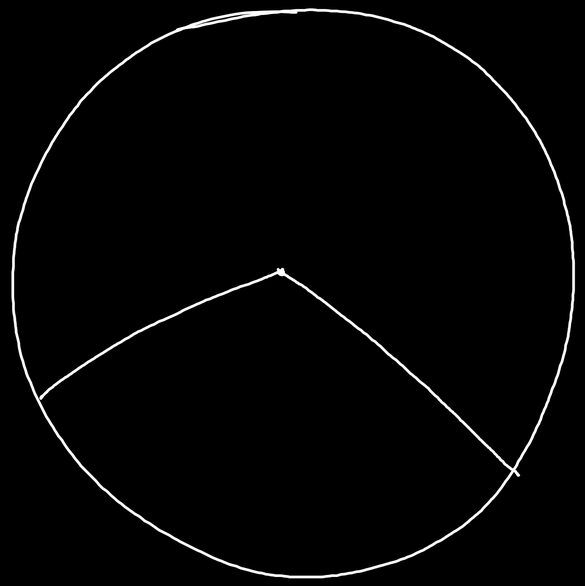
$l = 13 cm$



$l = \sqrt{r^2 + h^2}$

25) Perpendicular height of a cone is 12 cm and its slant height is 13 cm. Find the radius of the base of cone. [July 2019]

26) If the length of an arc of sector of a circle is 20 cm and if radius is 7cm, find the area of the sector. [July 2019]



$l = 20\ cm$

$r = 7\ cm$

A. of sector $= \frac{lr}{2}$

$= \frac{10}{\cancel{20}} \times 7$

$= 10 \times 7$

$= 70\ cm^2$

Q.3. A) Activity [each 3 marks]

1)

[Sept 2021]

If $\Delta ABC \sim \Delta PQR$, $A(\Delta ABC) = 81\ cm^2$, $A(\Delta PQR) = 121\ cm^2$, $BC = 6.3\ cm$, then complete the following activity to find QR.

Activity :

$\Delta ABC \sim \Delta PQR$ ..... (given)

$\therefore \quad \frac{A(\Delta ABC)}{A(\Delta PQR)} = \frac{BC^2}{QR^2}$ ..... th. of areas of similar Δs.

$\therefore \quad \frac{81}{121} = \frac{(6.3)^2}{QR^2}$

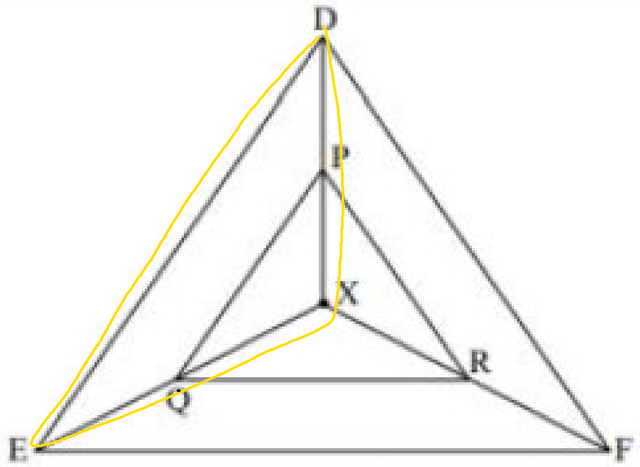
$\therefore \quad \frac{9}{11} = \frac{6.3}{QR}$ ..... (Taking square root of both sides)

$\therefore \quad QR = \frac{6.3 \times 11}{9}$

$\therefore \quad QR = 7.7\ cm$

2)

[March 2020, March 2023]



In the given figure, X is any point in the interior of the triangle. Point X is joined to the vertices of triangle. seg PQ || seg DE, seg QR || seg EF. Complete the activity and prove that seg PR || seg DF.

Proof:

In ΔXDE,

$PQ \parallel DE$ …(Given)

$\therefore \quad \frac{XP}{PD} = \frac{XQ}{QE}$ …(Basic proportionality theorem)…(i)

In ΔXEF,

$QR \parallel EF$ …(Given)

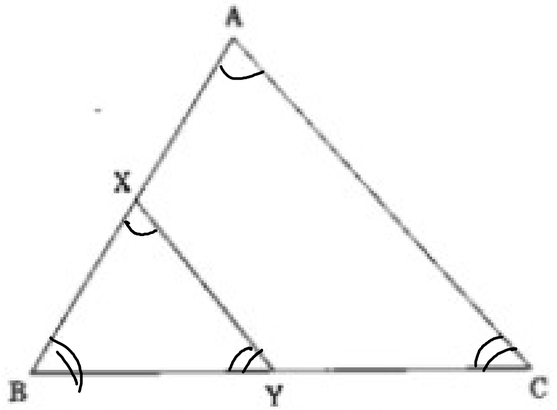
$\therefore \quad \frac{XQ}{QE} = \frac{XR}{RF}$ …(BPT)…(ii)

$\therefore \quad \frac{XP}{PD} = \frac{XR}{RF}$ …[From (i) and (ii)]

$\therefore$ seg PR || seg DF …(By converse of basic proportionality theorem)

3)

[Aug 2022]



In the above figure, in ΔABC

seg XY ∥ side AC, A-X-B, B-Y-C

If $2AX = 3BX$ and $XY = 9$, then complete the following activity to find the value of AC.

Activity :

∴ $2AX = 3BX$ ..... given

∴ $\frac{AX}{BX} = \frac{3}{2}$

∴ $\frac{AX + BX}{BX} = \frac{3+2}{2}$ ..... componendo

∴ $\frac{AB}{BX} = \frac{5}{2}$ ..... (I)

$\Delta BCA \sim \Delta BYX$ ..... (AA test of similarity)

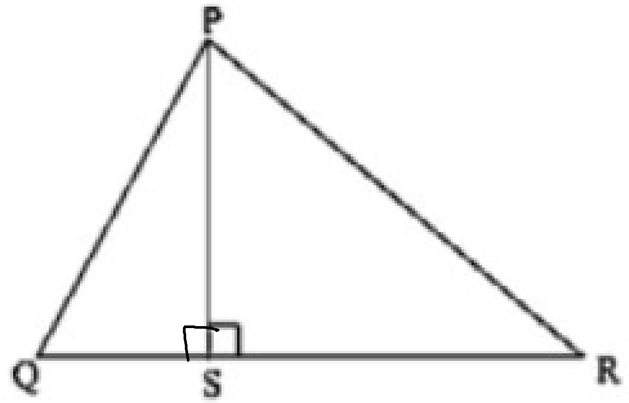
∴ $\frac{BA}{BX} = \frac{AC}{XY}$ ..... c.s.s.t.

∴ $\frac{5}{2} = \frac{AC}{9}$ ..... from (I)

∴ $AC = 22.5$

4)

[Nov 2020]



In ΔPQR, seg PS $\perp$ side QR, then complete the activity to prove $PQ^2 + RS^2 = PR^2 + QS^2$.

Activity:

In ΔPSQ, $\angle PSQ = 90°$

$\therefore$ $PS^2 + QS^2 = PQ^2$ ..... (Pythagoras theorem)

$\therefore$ $PS^2 = PQ^2 - \square$ ..... (I)

Similarly,

In ΔPSR, $\angle PSR = 90°$

$\therefore$ $PS^2 + \square = PR^2$ ..... (Pythagoras theorem)

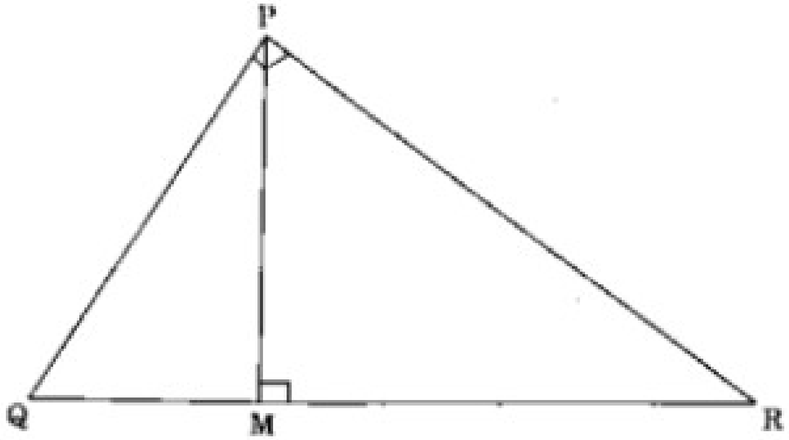
$\therefore$ $PS^2 = PR^2 - \square$ ..... (II)

$\therefore$ $PQ^2 - \square = \square - RS^2$ ..... from (I) and (II)

$\therefore$ $PQ^2 + \square = PR^2 + QS^2$

5)

[Aug 2022]



In the above figure $\angle QPR = 90°$, seg PM $\perp$ seg QR and Q-M-R PM = 10, QM = 8, then complete the following activity to find the value of QR.

Activity :

In ΔPQR, $\angle QPR = 90°$ and seg PM $\perp$ seg QR

$\therefore$ $PM^2 =$ QM $\times$ MR ..... 7th - Q-M

$\therefore$ $(10)^2 = 8 \times MR$

$\therefore$ $\frac{100}{8} = MR$

$\therefore$ 12.5 = MR

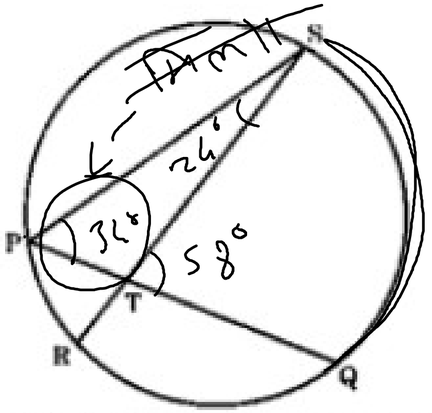
Now QR = QM + MR ..... (∵ Q-M-R)

$\therefore$ QR = 8 + 12.5

$\therefore$ QR = 20.5 unit

6)

[March 2022]



In the above figure, chord PQ and chord RS intersect each other at point T. If $\angle STQ = 58°$ and $\angle PSR = 24°$, then complete the following activity to verify :

$$\angle STQ = \frac{1}{2}\,[m(\text{arc PR}) + m(\text{arc SQ})]$$

Activity :

In $\triangle PTS$, $\angle PSR$

$\angle SPQ = \angle STQ -$ [ ] $\because$ Exterior angle theorem

$\therefore$ $\angle SPQ = 34°$

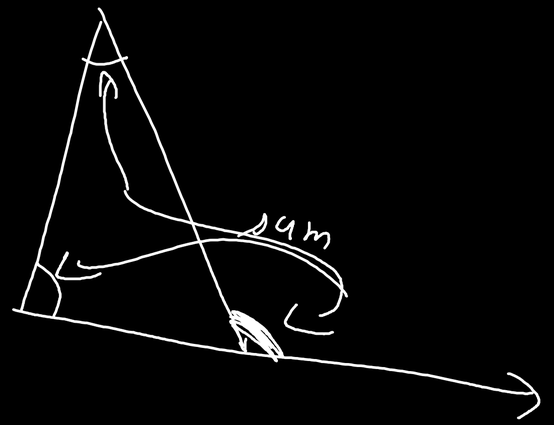
$\therefore$ $m(\text{arc QS}) = 2 \times$ [35]$° = 68°$ ..... $\because$ Inscribed $\angle$ thm.

Similarly $m(\text{arc PR}) = 2\angle PSR =$ [58]$°$

$\therefore$ $\frac{1}{2}\,[m(\text{arc QS}) + m(\text{arc PR})] = \frac{1}{2} \times$ [116]$° = 58°$ ..... (I)

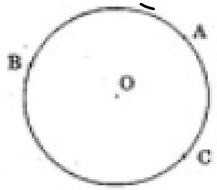
but $\angle STQ = 58°$ ..... (II) given

$\therefore$ $\frac{1}{2}\,[m(\text{arc PR}) + m(\text{arc QS})] =$ [$\angle STQ$] ..... from (I) and (II)



7)

[July 2023]



A, B, C are any points on the circle with centre O.

If $m(\text{arc BC}) = 110°$ and $m(\text{arc AB}) = 125°$, complete the following activity to find $m(\text{arc ABC})$, $m(\text{arc AC})$, $m(\text{arc ACB})$ and $m(\text{arc BAC})$.

Activity :

$m(\text{arc ABC}) = m(\text{arc AB}) + \square$

$= \square° + 110°$

$= 235°$

$m(\text{arc AC}) = 360° - m(\text{arc } \square)$

$= 360° - \square°$

$= 125°$

Similarly

$m(\text{arc ACB}) = 360° - \square°$

$= 235°$

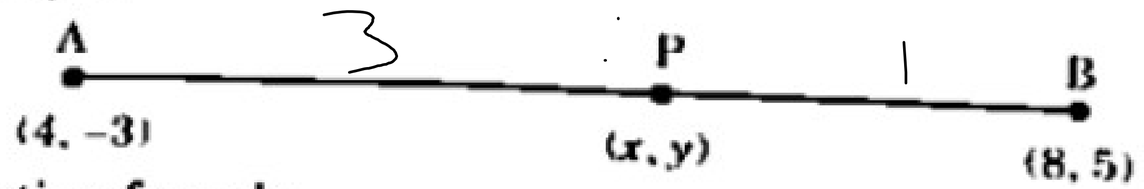
and $m(\text{arc BAC}) = 360° - \square$

$= 250°$

8) [March 2022]

Complete the following activity to find the co-ordinates of point P which divides seg AB in the ratio 3 : 1 where A(4, −3) and B(8, 5)

Activity :



By section formula,

$$x = \frac{mx_2 + nx_1}{m+n}, \quad y = \frac{my_2 + ny_1}{m+n}$$

$$x = \frac{3\times 8 + 1\times 4}{3+1}, \quad y = \frac{3\times 5 + 1\times(-3)}{3+1}$$

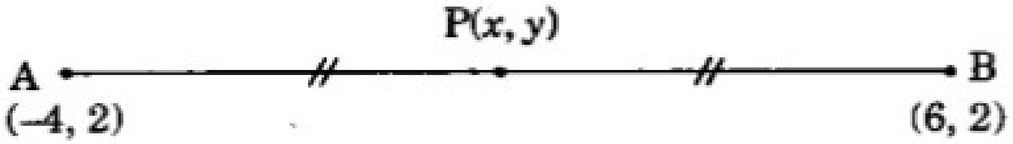
$$= \frac{24+4}{4} = \frac{15-3}{4}$$

$$x = 7 \quad \therefore \quad y = 3$$

9) [March 2023]

Find the co-ordinates of point P where P is the midpoint of a line segment AB with A(–4, 2) and B(6, 2).

Solution :



Suppose, $(-4, 2) = (x_1, y_1)$ and $(6, 2) = (x_2, y_2)$ and co-ordinates of P are (x, y)

According to midpoint theorem,

$$x = \frac{x_1 + x_2}{2} = \frac{-4 + 6}{2} = \frac{2}{2} = 1$$

$$y = \frac{y_1 + y_2}{2} = \frac{2 + 2}{2} = \frac{4}{2} = 2$$

Co-ordinates of midpoint P are $(1, 2)$

10) [July 2019]

1) Measure of arc of a circle is 36° and its length is 176 cm. Then complete the following activity to find the radius of circle.

Activity:

Here, measure of arc = $\theta = 36°$

Length of arc = $l = 176$ cm

$\therefore$ Length of arc $(l) = \frac{\theta}{360} \times 2\pi r$ ..... (formula)

$\therefore$ $176 = \frac{36}{360} \times 2 \times \frac{22}{7} \times r$

$\therefore$ $176 = \frac{1}{10} \times \frac{44}{7} \times r$

$\therefore$ $r = \frac{176 \times 70}{44}$

$\therefore$ $r = 4 \times 70$

Radius of circle (r) = 280 cm