10TH STANDARD MATHS 2

QUESTION WISE PYQ

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10th Standard | Maths 2 | Question wise PYQ

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July 2025 www.saiphy.com

Q.1. (A) Choose the correct alternative from given: [4]

i. If $\Delta ABC \sim \Delta DEF$, $m\angle B = 60°$, then $m\angle E =$ _____.

(A) 30° (B) 60°

(C) 90° (D) 45°

ii. Two circles of radii 5.5 cm and 4.2 cm touch each other externally then distance between their centres is _____.

(A) 9.7 cm (B) 1.3 cm

(C) 5.5 cm (D) 4.2 cm

iii. A line makes an angle of 45° with the positive direction of X–axis. So the slope of the line is _____.

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

(C) 1 (D) $\sqrt{3}$

iv. The volume of a cube of side 2 cm is _____.

(A) 4 cm^3 (B) 2 cm^3

(C) 6 cm^3 (D) 8 cm^3

March 2025 www.saiphy.com

Q.1. (A) Choose the correct alternative from given: [4]

i. Out of the following which is a Pythagorean triplet?

(A) (1, 5, 10) (B) (3, 4, 5)

(C) (2, 2, 2) (D) (5, 5, 2)

ii. $\angle ACB$ is inscribed angle in a circle with centre O. If $\angle ACB = 65°$, then what is measure of its intercepted arc AXB?

(A) 65° (B) 230°

(C) 295° (D) 130°

iii. Distance of point (3, 4) from the origin is _____.

(A) 7 (B) 1

(C) 5 (D) –5

iv. If radius of cone is 5 cm and its perpendicular height is 12 cm, then the slant height is _____.

(A) 17 cm (B) 4 cm

(C) 13 cm (D) 60 cm

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Q.1. (A) Four alternative answers for each of the following sub-questions are given. Choose the alternative and write its alphabet: [4]

1. Out of the dates given below which date constitutes a Pythagorean triplet?

(A) 15/8/17 (B) 16/8/16 (C) 3/5/17 (D) 4/9/15

2. $\sin\theta \times \operatorname{cosec}\theta = ?$

(A) 1 (B) 0 (C) $\frac{1}{2}$ (D) $\sqrt{2}$

3. Slope of X-axis is _____

(A) 1 (B) –1 (C) 0 (D) Cannot be determined

4. A circle having radius 3 cm, then the length of its largest chord is _____.

(A) 1.5 cm (B) 3 cm (C) 6 cm (D) 9 cm

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Q.1. (A) For each of the following sub-question four alternative answers are given. Choose the correct alternative and write its alphabet: **[4]**

1. The volume of a cube of side 10 cm is _____.
   (A) 1 cm^3 (B) 10 cm^3 (C) 100 cm^3 (D) 1000 cm^3

2. A line makes an angle of 30^o with positive direction of X-axis, then the slope of the line is _____.
   (A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{1}{\sqrt{3}}$ (D) $\sqrt{3}$

3. $\angle ACB$ is inscribed in arc ACB of a circle with centre O. If $\angle ACB = 65^o$, find m(arc ACB) :
   (A) 65^o (B) 130^o (C) 295^o (D) 230^o

4. Find the perimeter of a square if its diagonal is $10\sqrt{2}$ cm.
   (A) 10 cm (B) $40\sqrt{2}$ cm (C) 20 cm (D) 40 cm

Q.1. (A) Four alternative answers are given for every subquestion. Select the correct alternative and write the alphabet of that answer: **[4]**

1. If a, b, c are sides of a triangle and $a^2 + b^2 = c^2$, name the type of triangle:
   (A) Obtuse angled triangle (B) Acute angled triangle
   (C) Right angled triangle (D) Equilateral triangle

2. Chords AB and CD of a circle intersect inside the circle at point E. If AE = 4, EB = 10, CE = 8, then find ED:
   (A) 7 (B) 5 (C) 8 (D) 9

3. Co-ordinates of origin are _____.
   (A) (0, 0) (B) (0, 1) (C) (1, 0) (D) (1, 1)

4. If radius of the base of cone is 7 cm and height is 24 cm, then find its slant height:
   (A) 23 cm (B) 26 cm (C) 31 cm (D) 25 cm

Q.1. (A) Four alternative answers are given for every sub-question. Select the correct alternative and write the alphabet of that answer: **[4]**

i. From the following points _____ point lies to the right side of the origin on X-axis.
   (A) (–2, 0) (B) (0, 2)
   (C) (2, 3) (D) (2, 0)

ii. $\Delta PQR \sim \Delta STU$ and $A(\Delta PQR) : A(\Delta STU) = 64 : 81$, then what is the ratio of corresponding sides?
   (A) 8 : 9 (B) 64 : 81
   (C) 9 : 8 (D) 16 : 27

iii. In a right angled triangle; if the sum of the squares of sides making right angle is 169, then what is the length of hypotenuse?
   (A) 15 (B) 13
   (C) 5 (D) 12

iv. If $\tan\theta = \sqrt{3}$, then the value of θ is _____
   (A) 60° (B) 30°
   (C) 90° (D) 45°

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Q.1. (A) For each of the following sub-questions four alternative answers are given. Choose the correct alternative and write its alphabet: **[4]**

i. If $\Delta ABC \sim \Delta DEF$ and $\angle A = 48°$, then $\angle D =$ _____.
(A) 48° (B) 83° (C) 49° (D) 132°

ii. AP is a tangent at A drawn to the circle with center O from an external point P. OP = 12 cm and $\angle OPA = 30°$, then the radius of a circle is _____.
(A) 12 cm (B) $6\sqrt{3}$ cm (C) 6 cm (D) $12\sqrt{3}$ cm

iii. Seg AB is parallel to X-axis and co-ordinates of the point A are (1, 3), then the co-ordinates of the point B can be _____.
(A) (–3, 1) (B) (5, 1) (C) (3, 0) (D) (–5, 3)

iv. The value of $2\tan 45° - 2\sin 30°$ is_____.
(A) 2 (B) 1 (C) $\frac{1}{2}$ (D) $\frac{3}{4}$

Q.1. (A) For each of the following sub-question four alternative answers are given. Choose the correct alternative and write its alphabet: **[4]**

1. $\Delta ABC \sim \Delta PQR$ and $\angle A = 45°$, $\angle Q = 87°$, then $\angle C =$ _____.
(A) 45° (B) 87° (C) 48° (D) 90°

2. $\angle PRQ$ is inscribed in the arc PRQ of a circle with centre 'O'.
If $\angle PRQ = 75°$, then m(arc PRQ) = _____
(A) 75° (B) 150° (C) 285° (D) 210°

3. A line makes an angle of 60° with the positive direction of X-axis, so the slope of a line is _____.
(A) $\frac{1}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\sqrt{3}$ (D) $\frac{1}{\sqrt{3}}$

4. Radius of a sector of a circle is 5 cm and length of arc is 10 cm, then the area of a sector is _____.
(A) 50 cm^2 (B) 25 cm^2 (C) 25 m^2 (D) 10 cm^2

Q.1. A. Four alternative answers are given for every sub-question. Select the *correct* alternative and write the alphabet of that answer: **[4]**

i. Out of the following which is the Pythagorean triplet?
(A) (1, 5, 10) (B) (3, 4, 5) (C) (2, 2, 2) (D) (5, 5, 2)

ii. Two circles of radii 5.5 cm and 3.3 cm respectively touch each other externally. What is the distance between their centres?
(A) 4.4 cm (B) 2.2 cm (C) 8.8 cm (D) 8.9 cm

iii. Distance of point (–3, 4) from the origin is _____.
(A) 7 (B) 1 (C) –5 (D) 5

iv. Find the volume of a cube of side 3 cm:
(A) 27 cm^3 (B) 9 cm^3 (C) 81 cm^3 (D) 3 cm^3

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(B) Solve the following subquestions: **[4]**

i. Find the diagonal of square whose side is 10 cm.

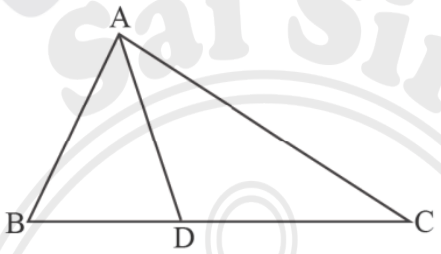
ii. The ratio of corresponding sides of similar triangles is 3 : 5, then find the ratio of their areas.

iii. Find the slope of the line passing through the points A(2, 3) and B(4, 7).

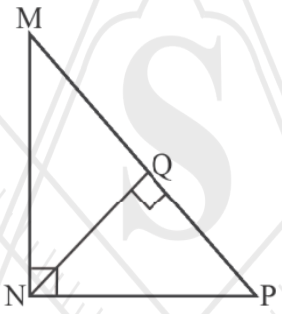
iv. If $\sin\theta = \frac{7}{25}$, then find the value of $\operatorname{cosec}\theta$.

(B) Solve the following sub-questions: **[4]**

i. In the following figure ΔABC, B – D – C and BD = 7, BC = 20, then find $\frac{A(\Delta ABD)}{A(\Delta ABC)}$.



ii. In the following figure $\angle MNP = 90°$, seg NQ $\perp$ seg MP, MQ = 9, QP = 4, find NQ.



iii. Angle made by a line with the positive direction of X-axis is 30°.Find slope of that line.

iv. In cyclic quadrilateral ABCD $m\angle A = 100°$, then find $m\angle C$.

(B) Solve the following sub-questions: **[4]**

1. If $\Delta ABC \sim \Delta PQR$ and AB : PQ = 2 : 3, then find the value of $\frac{A(\Delta ABC)}{A(\Delta PQR)}$.

2. Two circles of radii 5 cm and 3 cm touch each other externally. Find the distance between their centres.

3. Find the side of a square whose diagonal is $10\sqrt{2}$ cm.

4. Angle made by the line with the positive direction of X-axis is 45°. Find the slope of that line.

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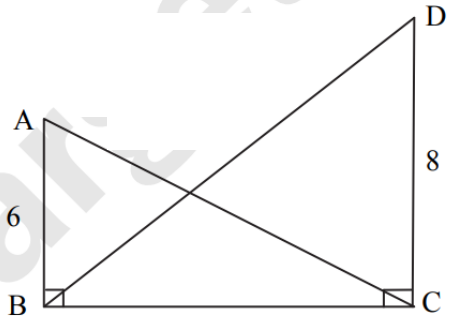
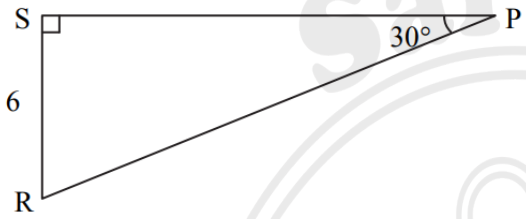
(B) Solve the following sub-questions: **[4]**

1. In the following figure, $\angle ABC = \angle DCB = 90^o$, AB = 6, DC = 8, then $\frac{A(\Delta ABC)}{A(\Delta DCB)} = ?$



2. In the following figure, find the length of RP using the information given in Δ PSR.



3. What is the distance between two parallel tangents of a circle having radius 4.5 cm?

4. Find the co-ordinates of midpoint of the segment joining the points A(4, 6) and B(–2, 2).

(B) Solve the following sub-questions: **[4]**

1. If $\Delta ABC \sim \Delta PQR$ and $\frac{A(\Delta ABC)}{A(\Delta PQR)} = \frac{16}{25}$, then find AB : PQ.

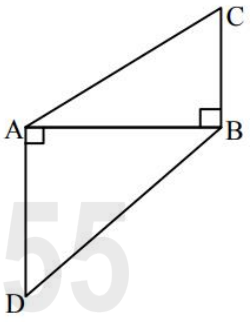
2. In ΔRST, $\angle S = 90°$, $\angle T = 30°$, RT = 12 cm, then find RS.

3. If radius of a circle is 5 cm, then find the length of longest chord of a circle.

4. Find the distance between the points O(0, 0) and P(3, 4).

(B) Solve the following sub-questions: **[4]**

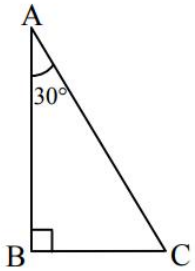
i. In the given figure, seg CB ⊥ seg AB, seg AD ⊥ seg AB.
If BC = 4, AD = 8,
then find $\frac{A(\Delta ABC)}{A(\Delta ADB)}$



ii. Find the coordinates of the midpoint of the segment joining the points (22, 20) and (0, 16).

iii. Two circles having radii 7 cm and 4 cm touch other internally. Find the distance between their centres.

iv. In ΔABC, $\angle B = 90°$, $\angle A = 30°$, AC = 14, then find BC.



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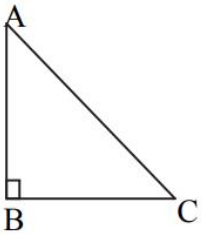
(B) Solve the following sub-questions: [4]

i. In Δ ABC, ∠ABC = 90°, ∠BAC = ∠BCA = 45°.

If AC = $9\sqrt{2}$, then find the value of AB.



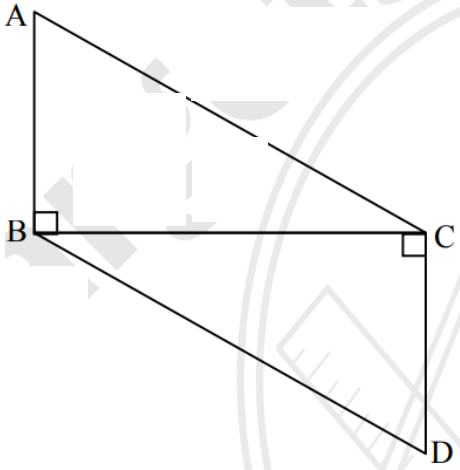
ii. Chord AB and chord CD of a circle with centre O are congruent. If m(arc AB) =120°, then find the m(arc CD).

iii. Find the Y-co-ordinate of the centroid of a triangle whose vertices are (4, –3), (7, 5) and (–2, 1).

iv. If sinθ = cosθ, then what will be the measure of angle θ ?

(B) Solve the following sub-questions: [4]

1.



In the above figure, seg AB ⊥ seg BC and seg DC ⊥ seg BC.

If AB = 3 cm and CD = 4 cm, then find $\frac{A(\Delta ABC)}{A(\Delta DCB)}$.

2. In cyclic □ABCD, ∠B = 75°, then find ∠D.

3. Point A, B, C are collinear. If slope of line AB is $-\frac{1}{2}$, then find the slope of line BC.

4. If 3 sin θ = 4 cos θ, then find the value of tan θ.

B. Solve the following questions: [4]

i. The ratio of corresponding sides of similar triangles is 3 : 5, then find the ratio of their areas.

ii. Find the diagonal of a square whose side is 10 cm.

iii. □ABCD is cyclic. If ∠B = 110°, then find measure of ∠D.

iv. Find the slope of the line passing through the points A(2, 3) and B(4, 7).

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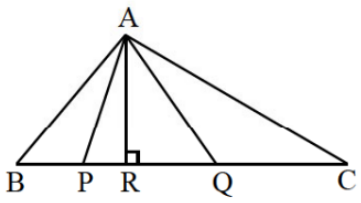
Q.2. (A) Complete the following activities and rewrite it *(any two)*: **[4]**

i. In the given figure, AR ⊥ BC, AR ⊥ PQ, then complete the activity for finding $\frac{A(\Delta ABC)}{A(\Delta APQ)}$.

Activity:

$$\frac{A(\Delta ABC)}{A(\Delta APQ)} = \frac{\square \times AR}{PQ \times \square}$$

$$\therefore \quad \frac{A(\Delta ABC)}{A(\Delta APQ)} = \frac{\square}{\square}$$



ii. In the following figure, seg PS is a tangent segment, line PR is a secant. If PQ = 3.6, QR = 6.4, then find PS by completing the following activity.

Activity:

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

(tangent secant segments theorem)

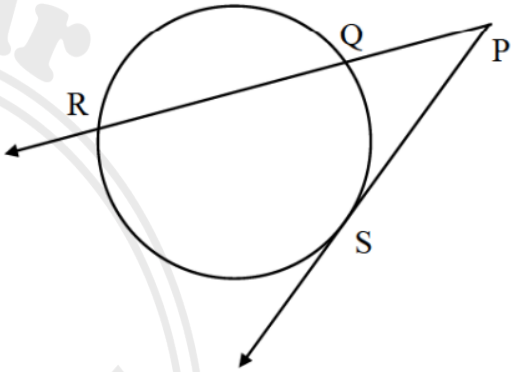
$\therefore \quad PS^2 = PQ \times (PQ + \square)$

$\therefore \quad PS^2 = 3.6 \times (3.6 + \square)$

$\therefore \quad PS^2 = 3.6 \times 10$

$\therefore \quad PS^2 = 36$

$\therefore \quad PS = \square$



iii. Measure of an arc of a circle is 90° and its radius is 14 cm. Complete the following activity to find the length of an arc.

Activity:

Length of an arc = $\frac{\theta}{360} \times \square$ ...(Formula)

$= \frac{90}{360} \times 2 \times \frac{22}{7} \times \square$

$= \frac{1}{4} \times \square$

Length of an arc = $\square$ cm

Q.2. (A) Complete the following activities and rewrite it *(any two)*: **[4]**

i. The radius of a circle with centre 'P' is 10 cm. If chord AB of the circle subtends a right angle at P, find area of minor sector by using the following activity. ($\pi = 3.14$)

Activity:

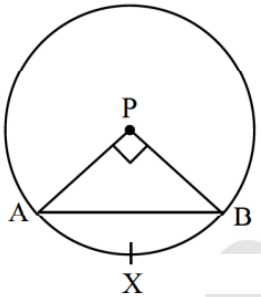
r = 10 cm, $\theta = 90°$, $\pi = 3.14$.

$A(P\text{–}AXB) = \frac{\theta}{360} \times \square$

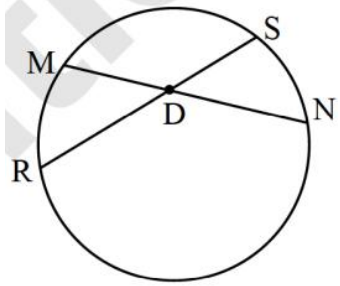
$= \frac{\square}{360} \times 3.14 \times 10^2$

$= \frac{1}{4} \times \square$

A(P–AXB) = $\square$ sq.cm.



ii. In the following figure chord MN and chord RS intersect at point D. If RD = 15, DS = 4, MD = 8, find DN by completing the following activity:



Activity:

$\therefore$ MD × DN = $\square$ × DS _____.

…(Theorem of internal division of chords)

$\therefore$ $\square$ × DN = 15 × 4

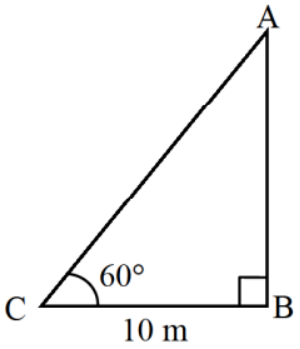
$\therefore$ DN = $\dfrac{\square}{8}$

$\therefore$ DN = $\square$

iii. An observer at a distance of 10 m from tree looks at the top of the tree, the angle of elevation is 60°. To find the height of tree complete the activity. $\left(\sqrt{3} = 1.73\right)$

Activity:

In the figure given, AB = h = height of tree, BC = 10 m, distance of the observer from the tree.



Angle of elevation (θ) = ∠BCA = 60°

$\tan\theta = \dfrac{\square}{BC}$ …(i)

$\tan 60° = \square$ …(ii)

$\dfrac{AB}{BC} = \sqrt{3}$ …[from (i) and (ii)]

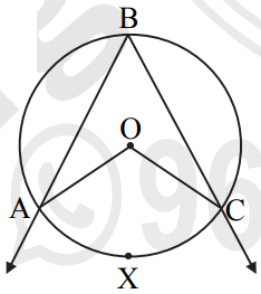
$AB = BC \times \sqrt{3} = 10\sqrt{3}$

$AB = 10 \times 1.73 = \square$

$\therefore$ height of the tree is $\square$ m.

Q.2. (A) Complete any *two* activities and rewrite it: **[4]**

1.



In the above figure, ∠ABC is inscribed in arc ABC.

If ∠ABC = 60°, find m∠AOC.

Solution:

$\angle ABC = \dfrac{1}{2}$ m(arc AXC) … $\square$

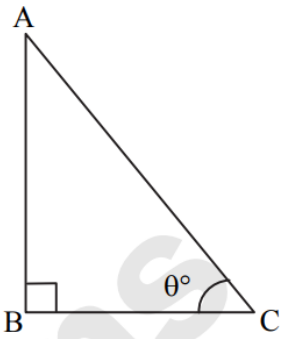
$60° = \dfrac{1}{2}$ m(arc AXC)

$\square$ = m(arc AXC)

But $m\angle AOC =$ $\boxed{m(arc.....)}$ …[Property of central angle]

$\therefore$ $m\angle AOC =$ $\boxed{\quad}$

2. Find the value of $\sin^2\theta + \cos^2\theta$.



Solution:

In Δ ABC, $\angle ABC = 90°$, $\angle C = \theta°$.

$AB^2 + BC^2 =$ $\boxed{\quad}$ …[Pythagoras theorem]

Divide both sides by AC^2

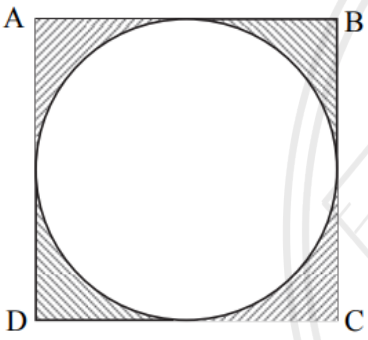
$$\frac{AB^2}{AC^2} + \frac{BC^2}{AC^2} = \frac{AC^2}{AC^2}$$

$\therefore$ $\left(\frac{AB}{AC}\right)^2 + \left(\frac{BC}{AC}\right)^2 = 1$

But $\frac{AB}{AC} =$ $\boxed{\quad}$ and $\frac{BC}{AC} =$ $\boxed{\quad}$

$\therefore$ $\sin^2\theta + \cos^2\theta =$ $\boxed{\quad}$

3.



In the figure given above, □ABCD is a square and a circle in inscribed in it. All sides of a square touch the circle.

If AB = 14 cm, find the area of shaded region.

Solution:

Area of square $= \left(\boxed{\quad}\right)^2$ …[Formula]

$= 14^2$

$=$ $\boxed{\quad}$ cm^2

Area of circle $=$ $\boxed{\quad}$ …[Formula]

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

$= 154\ cm^2$

Area of shaded portion = Area of square – Area of circle

$= 196 - 154$

$=$ $\boxed{\quad}$ cm^2

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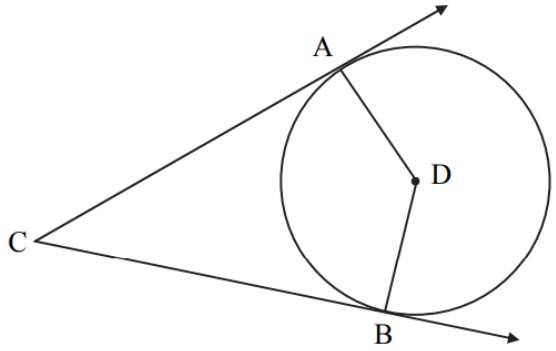
Q.2. (A) Complete the following activities and rewrite it (any *two*): **[4]**

1.



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 = □° ….. Tangent theorem

∴ ∠ACB + ∠CAD + ∠CBD + ∠ADB = □°

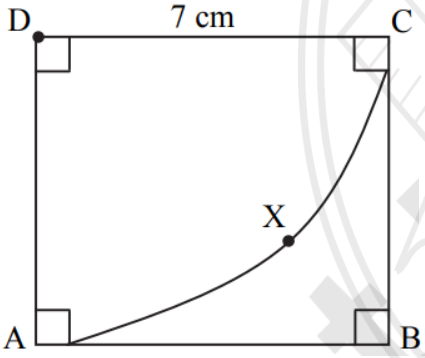
∴ 52° + 90° + 90° + ∠ADB = 360°

∴ ∠ADB + □° = 360°

∠ADB = 360° – 232°

∴ ∠ADB = □°

2.



In the above figure, side of square ABCD is 7 cm with centre D and radius DA sector D-AXC is drawn.

Complete the following activity to find the area of square ABCD and sector D-AXC.

Activity:

Area of square = □ ….. formula

$= (7)^2$

$= 49 \text{ cm}^2$

Area of sector (D–AXC) = □ ….. formula

$= \frac{\square}{360} \times \frac{22}{7} \times \square$

$= 38.5 \text{ cm}^2$

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

Activity:

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

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

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

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

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

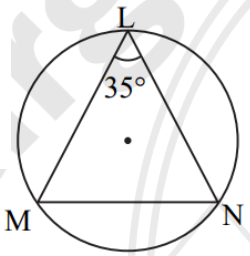
$$= \square \times \sec\theta$$

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

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

Q.2. (A) **Complete the following activities (any *two*):** **[4]**

1



In the above figure, $\angle L = 35°$, find:

i. m(arc MN)

ii. m(arc MLN)

Solution:

i. $\angle L = \frac{1}{2}$ m(arc MN) …(By inscribed angle theorem)

$\therefore$ $\square = \frac{1}{2}$ m(arc MN)

$\therefore$ $2 \times 35 =$ m(arc MN)

$\therefore$ m(arc MN) = $\square$

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

Solution:

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

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

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

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

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

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

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

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

3. Find the surface area of a sphere of radius 7 cm.

Solution:

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

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

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

$= \square \times 7$

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

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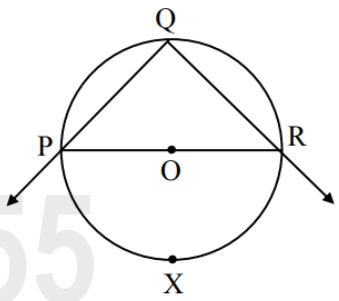
Q.2. (A) Complete the following activities and rewrite it (any *two*): **[4]**

i. In the above figure, $\angle PQR$ is inscribed in the semicircle PQR.
Complete the following activity to find measure of $\angle PQR$.



Activity:

m(arc PQR) = 180° ...(measure of semicircle)

$\therefore$ m(arc PXR) = $\square$

$\therefore$ $\angle PQR = \frac{1}{2}$ m(arc $\square$) ... $\square$

$= \frac{1}{2} \times 180°$

$\therefore$ $\angle PQR = \square$

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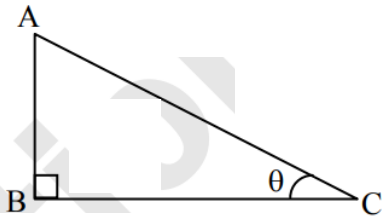
ii. In ΔABC, $\angle B = 90°$, $\angle C = \theta°$ then complete the activity to derive the trigonometric identity.



Activity:

$AB^2 + BC^2 =$ ☐ …(Pythagoras theorem)

$\therefore \quad \frac{AB^2}{AB^2} + \frac{BC^2}{AB^2} = \frac{AC^2}{AB^2}$ …(dividing by AB^2)

$\therefore \quad 1 + \frac{BC^2}{AB^2} = \frac{AC^2}{AB^2}$

But $\frac{\square}{AB^2} = \cot^2\theta$ and $\frac{AC^2}{\square} = \text{cosec}^2\theta$

$\therefore \quad 1 + \square = \text{cosec}^2\theta$

iii. In ΔPQR, if PN = 12, NR = 8, PM = 15, MQ = 12, then complete the following activity to justify whether seg NM is parallel to side RQ or not.

Activity:

In ΔPQR,

$\frac{PN}{NR} = \frac{12}{\square} = \frac{3}{2}$ …(i)

and $\frac{PM}{MQ} = \frac{15}{12} = \frac{\square}{4}$ …(ii)

$\therefore \quad \frac{PN}{NR} \neq \frac{PM}{MQ}$ …[from (i) and (ii)]

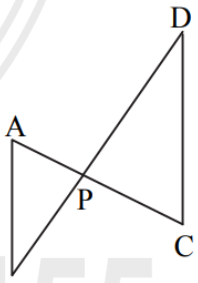
$\therefore$ By ☐

seg NM is ☐ to side RQ.

[Note : The activity has been modified.]

Q.2. (A) Complete the following activities and rewrite it (any *two*): **[4]**

i. In the above figure, seg AC and seg BD intersect each other in point P. If $\frac{AP}{CP} = \frac{BP}{DP}$, then complete the following activity to prove $\Delta ABP \sim \Delta CDP$.



Activity: In ΔAPB and ΔCDP

$\frac{AP}{CP} = \frac{BP}{DP}$ ..... ☐

$\therefore \quad \angle APB \cong$ ☐ ..... vertically opposite angles

$\therefore \quad$ ☐ ~ΔCDP..... ☐ test of similarity.

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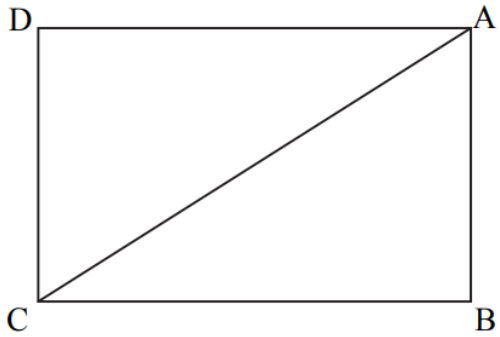
ii. In the above figure, □ABCD is a rectangle. If AB = 5, AC = 13, then complete the following activity to find BC.



Activity:

ΔABC is ☐ triangle.

∴ By Pythagoras theorem

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

∴ $25 + BC^2 =$ ☐ ∴ $BC^2 =$ ☐

∴ $BC =$ ☐

iii. Complete the following activity to prove: $\cot\theta + \tan\theta = \text{cosec}\theta \times \sec\theta$

Activity:

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

$= \frac{\cos\theta}{\sin\theta} + \frac{\square}{\cos\theta} = \frac{\square + \sin^2\theta}{\sin\theta \times \cos\theta}$

$= \frac{1}{\sin\theta \times \cos\theta}$ ..... $\because \square = \frac{1}{\sin\theta} \times \frac{1}{\cos\theta}$

$= \square \times \sec\theta$

∴ L.H.S. = R.H.S.

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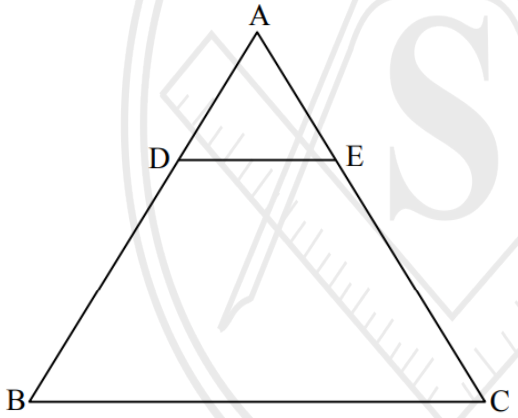
Q.2. (A) Complete the following activities and rewrite it (Any two): [4]

1.



In ΔABC, seg DE || 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 || side BC ..... (given)

∴ $\frac{AD}{DB} = \frac{AE}{EC}$ ..... ☐

∴ $\frac{6}{9} = \frac{AE}{\square}$

∴ $AE = \frac{6 \times 7.5}{\square}$

∴ AE = ☐

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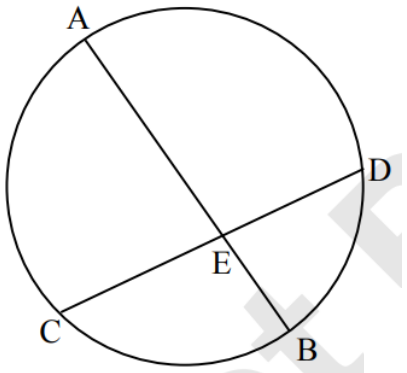
2.



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 ….. □

∴ □ × ED = 15 × 6

∴ $ED = \frac{\square}{12}$

∴ ED = □

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

Activity:

Let C(3, 5) ≡ (x_1, y_1), D(–2, –3) ≡ (x_2, y_2)

$CD = \sqrt{\left(x_2 - \square\right)^2 + \left(y_2 - y_1\right)^2}$ …. (formula)

∴ $CD = \sqrt{\left(-2 - \square\right)^2 + \left(-3 - 5\right)^2}$

∴ $CD = \sqrt{\square + 64}$

∴ $CD = \sqrt{\square}$

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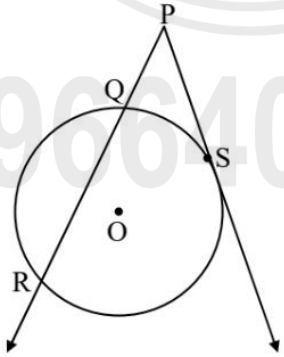
Q.2. A. **Complete and write the following activities (Any *two*):** **[4]**

i.



In the figure given above, 'O' is the centre of the circle, seg PS is a tangent segment and S is the point of contact. Line PR is a secant.

If PQ = 3.6, QR = 6.4, find PS.

Solution:

$PS^2 = PQ \times \square$ ...(tangent secant segments theorem)

$= PQ \times (PQ \times \square)$

$= 3.6 \times (3.6 + 6.4)$

$= 3.6 \times \square$

$= 36$

$\therefore$ PS = $\square$ …(by taking square roots)

ii. If $\sec\theta = \frac{25}{7}$, find the value of $\tan\theta$.

Solution:

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

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

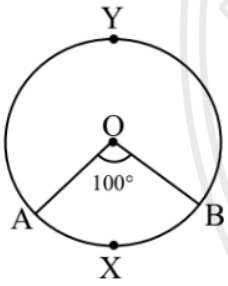
$\therefore \quad \tan^2\theta = \frac{625}{49} - \square$

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

$= \frac{\square}{49}$

$\therefore \quad \tan\theta = \frac{\square}{7}$ …(by taking square roots)

iii.



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		
Major arc		

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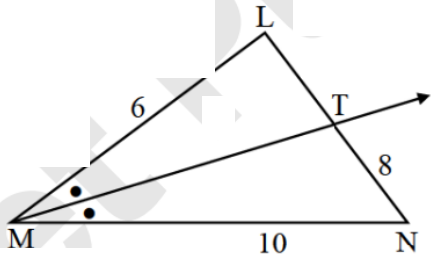
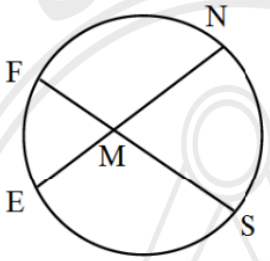
(B) Solve the following subquestions *(any four)*: **[8]**

i. In the following figure
In ΔLMN, ray MT bisects ∠LMN.
If LM = 6, MN = 10, TN = 8, then find LT.



ii. Find surface area of sphere of radius 7 cm.

iii. In the following figure, m(arc NS) = 125°, m (arc EF) = 37°. Find m∠NMS.

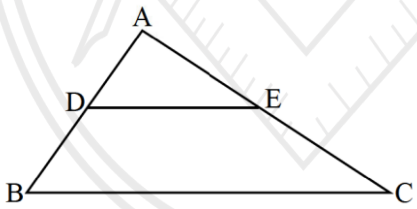


iv. Find the co-ordinates of midpoint of the segment joining the points P(22, 20) and Q(0, 16).

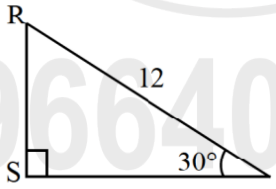
v. Find the volume of a cone if radius of its base is 7 cm and its perpendicular height is 15 cm.

(B) Solve the following sub-questions *(any four)*: **[8]**

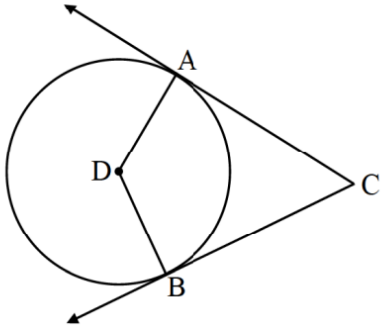
i. In ΔABC, DE || BC. If DB = 5.4 cm, AD = 1.8 cm, EC = 7.2 cm, then find AE.



ii. In the figure given below, find RS and PS using the information given in ΔPSR.



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



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iv. Verify, whether points, A(1, –3), B(2, –5) and C(–4, 7) are collinear or not.

v. If $\sin\theta = \frac{11}{61}$, find the values of $\cos\theta$ using trigonometric identity.

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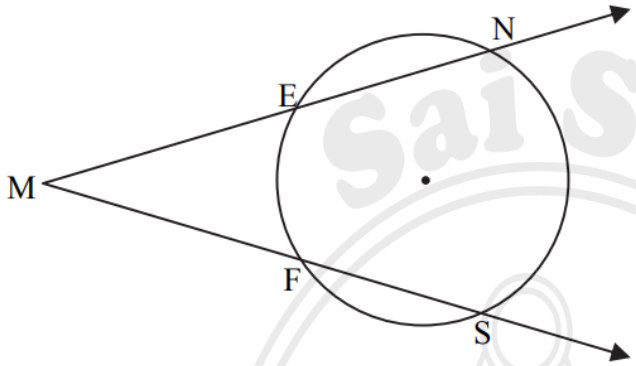
(B) Solve any *four* of the following sub-questions: **[8]**

1. Radius of a sector of a circle is 3.5 cm and length of its arc is 2.2 cm. Find the area of the sector.

2. Find the length of the hypotenuse of a right-angled triangle if remaining sides are 9 cm and 12 cm.

3.



In the above figure, m(arc NS) = 125°, m(arc EF) = 37°.
Find the measure of ∠NMS.

4. Find the slope of the line passing through the points A(2, 3), B(4, 7).

5. Find the surface area of a sphere of radius 7 cm.

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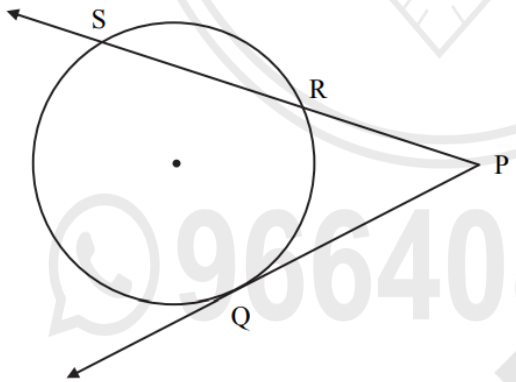
(B) Solve the following sub-questions (Any *four*): **[8]**

1. If $\cos\theta = \frac{3}{5}$, then find $\sin\theta$.

2. Find slope of line EF, where co-ordinates of E are (–4, –2) and co-ordinates of F are (6, 3).

3.



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

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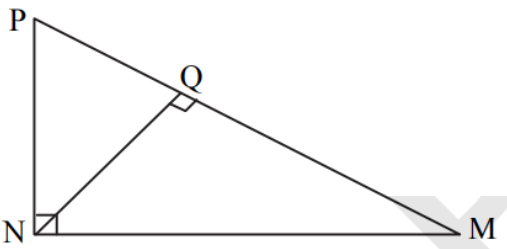
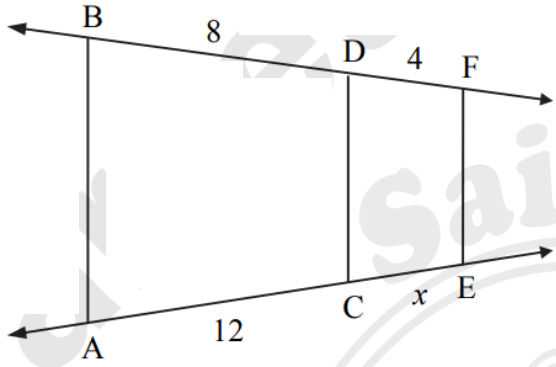
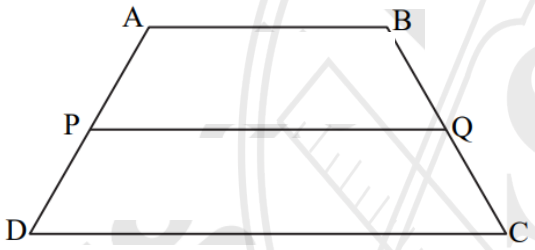
4. 

In the above figure, $\angle MNP = 90^{\circ}$, seg NQ $\perp$ seg MP. MQ = 9, QP = 4. Find NQ.

5. 

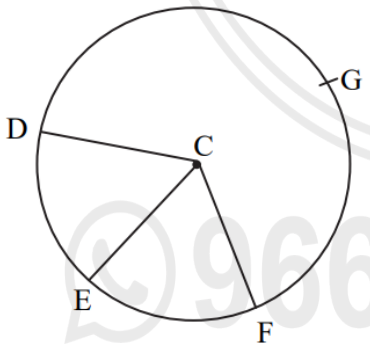
In the above figure, if AB || CD || EF, then find x and AE by using the information given in the figure.

(B) Solve the following sub-questions(Any *four*): [8]

1. 

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

2. Find the length of the diagonal of a rectangle whose length is 35 cm and breadth is 12 cm.

3. 

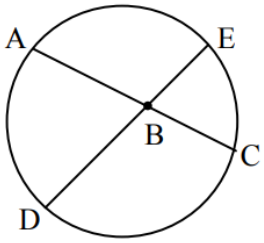
In the given figure points G, D, E, F are points of a circle with centre C, $\angle ECF = 70°$, m(arc DGF) = 200°.
Find:
i. m(arc DE) ii. m(arc DEF).

4. Show that points A(−1, −1), B(0, 1), C(1, 3) are collinear.

5. A person is standing at a distance of 50 m from a temple looking at its top. The angle of elevation is of 45°. Find the height of the temple.

(B) Solve the following sub-questions (Any *four*): **[8]**

i. In the given figure,
chord AC and chord DE intersect each other at point B.
If ∠ABE = 108° and m(arc AE) = 95°,
Then fine m(arc DC).



ii. Find the distance between the points P(–1, 1) and Q(5, –7).

iii. Construct a tangent to a circle with centre P and radius 3.5 cm at any point M on it.

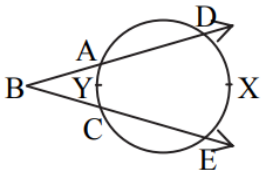
iv. Find the length of diagonal of rectangle having sides 11 cm and 60 cm.

v. If $\sin\theta = \frac{7}{25}$, then find values of cos θ and tan θ.

(B) Solve the following sub-questions (any *four*): **[8]**

i. If ΔABC ~ ΔPQR, AB : PQ = 4 : 5 and A(ΔPQR) = 125 cm^2, then find A(ΔABC).

ii.



In the above figure, m(arc DXE) = 105°, m(arc AYC) = 47°, then find the measure of ∠DBE.

iii. 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.

iv. If $\sin\theta = \frac{11}{61}$, then find the value of cos θ using trigonometric identity.

v. In ΔABC, AB = 9 cm, BC = 40 cm, AC = 41 cm. State whether ΔABC is a right-angled triangle or not? Write reason.

B. Solve the following sub-questions (Any four): **[8]**

1. ΔABC ~ ΔPQR, A(ΔABC) = 81 cm^2, A(ΔPQR) = 121 cm^2.
If BC = 6.3 cm, then find QR.
2. In ΔPQR, ∠P = 60°, ∠Q = 90° and QR = $6\sqrt{3}$ cm, then find the values of PR and PQ.
3. Find the slope of a line passing through the points A(2, 5) and B(4, –1).
4. Draw a circle with centre 'O' and radius 3.2 cm. Draw a tangent to the circle at any point P on it.
5. Find the surface area of a sphere of radius 7 cm.

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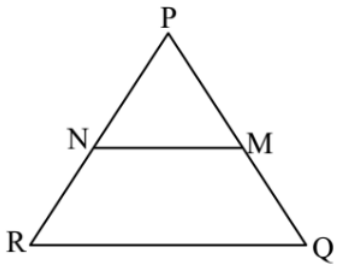
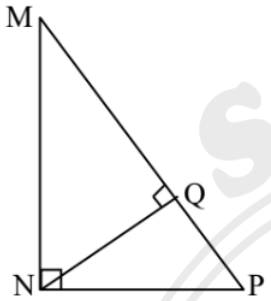
B. Solve the following sub-questions (Any *four*): **[8]**

i.



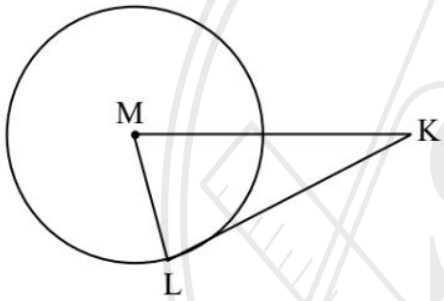
In ΔPQR, NM || RQ. If PM = 15, MQ = 10, NR = 8, then find PN.

ii.



In ΔMNP, ∠MNP = 90°, seg NQ ⊥ seg MP. If MQ = 9, QP = 4, then find NQ.

iii.



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

iv. Find the co-ordinates of midpoint of the segment joining the points (22, 20) and (0, 16).

v. 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.

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Q.3. (A) Complete the following activities and rewrite it *(any one)*: **[3]**

i. If $\tan\theta = 1$, then find the value of $\frac{\sin\theta+\cos\theta}{\sec\theta+\operatorname{cosec}\theta}$ by completing the following activity.

Activity:

$\tan\theta = 1$ …[Given]

but $\tan\square = 1$

$\therefore \quad \theta = \square$

$\therefore \quad \frac{\sin\theta+\cos\theta}{\sec\theta+\operatorname{cosec}\theta} = \frac{\sin 45°+\cos 45°}{\sec 45°+\operatorname{cosec} 45°}$

$= \frac{\frac{1}{\square}+\frac{1}{\sqrt{2}}}{\sqrt{2}+\square}$

$= \frac{\frac{2}{\sqrt{2}}}{\square}$

$\frac{\sin\theta+\cos\theta}{\sec\theta+\operatorname{cosec}\theta} = \frac{1}{\square}$

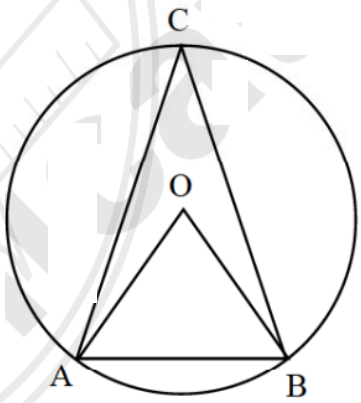
ii. In the following figure, point O is the centre of the circle and length of chord AB is equal to the radius of the circle. Find the measures of:

a. $\angle AOB$

b. arc AB

c. $\angle ACB$

by completing the activity.



Activity:

In ΔAOB,

$AO = OB = AB$

$\therefore$ ΔAOB is an $\square$ triangle.

$\therefore$ $m\angle AOB = \square$

$m\angle AOB = m(\text{arc AB}) = \square$ (definition of measure of an arc)

$m\angle ACB = \frac{1}{2}\times\square$ …. $\square$

$= \frac{1}{2}\times 60°$

$m\angle ACB = \square$

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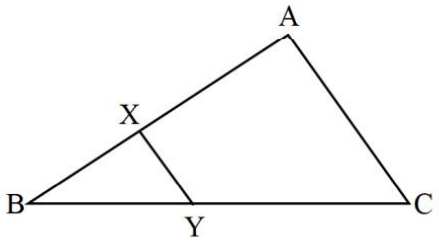
Q.3. (A) Complete the following activities and rewrite it *(any one)*: **[3]**

i. In the following figure, XY || seg AC. If 2AX = 3BX and XY = 9. Complete the activity to find the value of AC.



Activity:

$2AX = 3BX$ …[Given]

$\therefore \quad \frac{AX}{BX} = \frac{3}{\square}$

$\frac{AX+BX}{BX} = \frac{3+2}{2}$ …[by componendo]

$\frac{\square}{BX} = \frac{5}{2}$ …(i)

Now $\Delta BCA \sim \Delta BYX$ …[ ] test of similarity]

$\therefore \quad \frac{BA}{BX} = \frac{AC}{XY}$ …[corresponding sides of similar triangles]

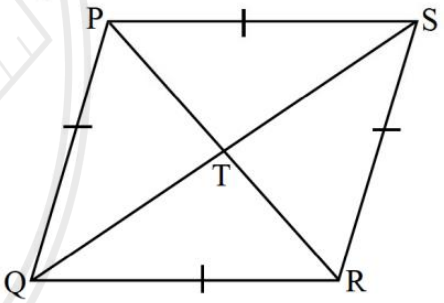
$\frac{\square}{\square} = \frac{AC}{9}$ …[from (i)]

$\therefore \quad AC = \square$

ii. Complete the following activity to prove that the sum of squares of diagonals of a rhombus is equal to the sum of the squares of the sides.

Given:

□PQRS is a rhombus. Diagonals PR and SQ intersect each other at point T.



To prove:

$PS^2 + SR^2 + QR^2 + PQ^2 = PR^2 + QS^2$

Activity:

Diagonals of a rhombus bisect each other.

In ΔPQS, PT is the median and in ΔQRS, RT is the median.

$\therefore$ by Apollonius theorem,

$PQ^2 + PS^2 = \square + 2QT^2$ …(i)

$QR^2 + SR^2 = \square + 2QT^2$ …(ii)

adding (i) and (ii),

$PQ^2 + PS^2 + QR^2 + SR^2$

$= 2(PT^2 + \square) + 4QT^2$

$= 2(PT^2 + \square) + 4QT^2$ …(RT = PT)

$= 4PT^2 + 4QT^2$

$= (\square)^2 + (2QT)^2$

$\therefore \quad PQ^2 + PS^2 + QR^2 + SR^2 = PR^2 + \square$.

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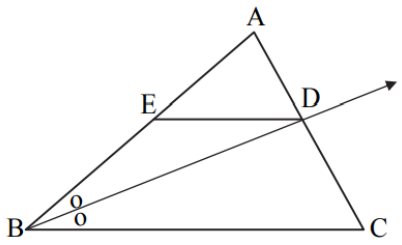
Q.3. (A) Complete any *one* activity of the following and rewrite it: **[3]**

1.



In ΔABC, ray BD bisects ∠ABC, A – D – C, seg DE || side BC, A – E – B, then for showing $\frac{AB}{BC} = \frac{AE}{EB}$, complete the following activity:

Proof:

In ΔABC, ray BD bisects ∠B

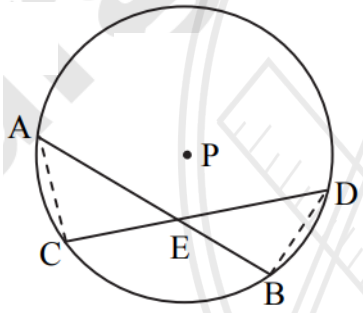
∴ $\frac{\square}{BC} = \frac{AD}{DC}$ …(I) (☐)

In ΔABC, DE || BC

∴ $\frac{\square}{EB} = \frac{AD}{DC}$ …(II) (☐)

$\frac{AB}{\square} = \frac{\square}{EB}$ …[From (I) and (II)]

2.



Given: Chords AB and CD of a circle with centre P intersect at point E.

To prove: AE × EB = CE × ED

Construction: Draw seg AC and seg BD.

Fill in the blank and complete the proof.

Proof:

In ΔCAE and ΔBDE.

∠AEC ≅ ∠DEB ….☐

☐ ≅ ∠BDE (angles inscribed in the same arc)

∴ ΔCAE ~ ΔBDE …☐

∴ $\frac{\square}{DE} = \frac{CE}{\square}$ …☐

∴ AE × EB = CE × ED.

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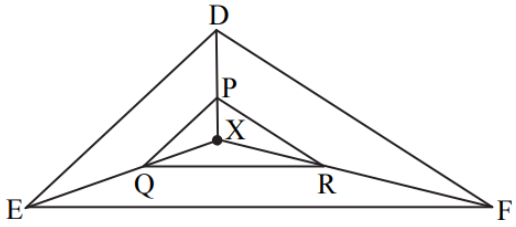
Q.3. (A) Complete the following activities and rewrite it (any *one*): [3]

1.



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

Activity :

In ΔXDE, PQ || DE ….(given)

$\therefore \quad \frac{XP}{\square} = \frac{\square}{QE}$ ….(I) Basic proportionality theorem

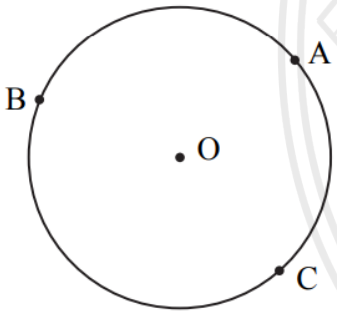
In ΔXEF, QR || EF ….(given)

$\therefore \quad \frac{XQ}{QE} = \frac{\square}{RF}$ ….(II) $\square$

$\therefore \quad \frac{XP}{PD} = \frac{\square}{\square}$ ….from (I) and (II)

$\therefore$ seg PR || seg DF ….Converse of basic proportionality theorem

2.



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

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

Activity :

m(arc ABC) = m(arc AB) + $\square$

= $\square^{\circ}$ + 110°

= 235°

m(arc AC) = 360° – m(arc $\square$)

= 360° – $\square^{\circ}$

= 125°

Similarly

m(arc ACB) = 360° – $\square$

= 235°

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

$= 360° - \square^{o}$

$= 125°$

Similarly

$m(\text{arc ACB}) = 360° - \square$

$= 235°$

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

$= 250°$

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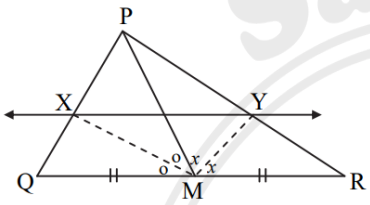
Q.3. (A) Complete the following activities (any *one*): **[3]**

1.



In ΔPQR, seg PM is a median. Angle bisectors of ∠PMQ and ∠PMR intersect side PQ and side PR in points X and Y respectively. Prove that XY || QR.
Complete the proof by filling in the boxes.

Solution:

In ΔPMQ,
Ray MX is the bisector of ∠PMQ

$\therefore \quad \frac{MP}{MQ} = \frac{\square}{\square}$ ….(I) [Theorem of angle bisector]

Similarly, in ΔPMR, Ray MY is bisector of ∠PMR

$\therefore \quad \frac{MP}{MR} = \frac{\square}{\square}$ ….(II) [Theorem of angle bisector]

But $\frac{MP}{MQ} = \frac{MP}{MR}$ …(III) [As M is the midpoint of QR]

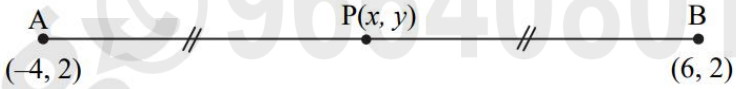
Hence MQ = MR

$\therefore \quad \frac{PX}{\square} = \frac{\square}{YR}$ …[From (I), (II) and (III)]

$\therefore \quad XY \parallel QR$ …[Converse of basic proportionality theorem]

2. 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)

$\therefore$ According to midpoint theorem,

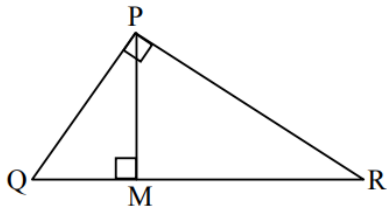
$x = \frac{x_1 + x_2}{2} = \frac{\square + 6}{2} = \frac{\square}{2} = \square$

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

$\therefore$ Co-ordinates of midpoint P are $\square$

Q.3. (A) Complete the following activities and rewrite it (any *one*): **[3]**

i. In the above figure
∠QPR = 90°, seg PM ⊥ seg QR and Q-M-R. PM = 10, QM = 8. Complete the following activity to find the value of QR.



Activity:
In ΔPQR, ∠QPR = 90° and
seg PM ⊥ seg QR ….(Given)

∴ $PM^2 =$ ☐ × MR ….☐

∴ $(\square)^2 = 8 \times MR$

∴ $\frac{100}{8} = MR$

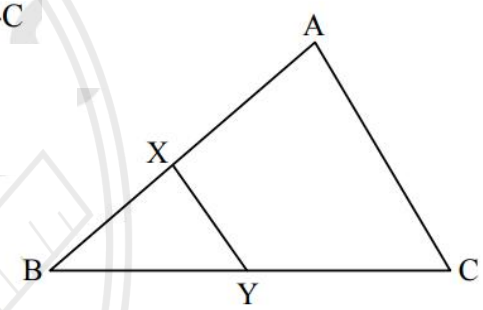
∴ ☐ = MR

Now QR = QM + MR ….(∵ Q-M-R)

∴ QR = 8 + ☐

∴ QR = ☐

ii. 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 value of AC.



Activity:
2AX = 3BX …(Given)

∴ $\frac{AX}{BX} = \frac{\square}{\square}$

∴ $\frac{AX+BX}{BX} = \frac{3+2}{A(\Delta PQR)}$ …(Componendo)

∴ $\frac{AB}{BX} = \frac{5}{2}$ …(i)

ΔABC ~ ΔBYX …(☐ test of similarity)

∴ $\frac{BA}{BX} = \frac{AC}{\square}$ …(c.s.s.t)

∴ $\frac{BA}{BX} = \frac{AC}{\square}$ …[from (i)]

∴ AC = ☐

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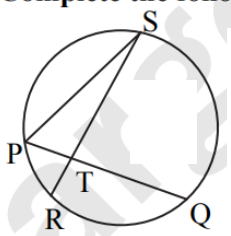
Q.3. (A) Complete the following activities and rewrite it (any *one*): **[3]**

i.



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 ΔPTS,

$\angle SPQ = \angle STQ - \square$ $\because$ Exterior angle theorem

$\therefore$ $\angle SPQ = 34°$

$\therefore$ $m(\text{arc } QS) = 2 \times \square^\circ = 68°$ ..... $\because$ $\square$

Similarly $m(\text{arc } PR) = 2\angle PSR = \square^\circ$

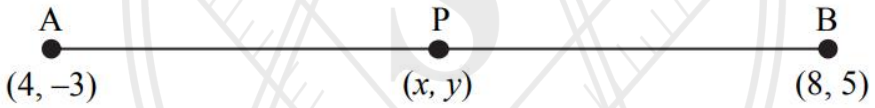
$\therefore$ $\frac{1}{2}[m(\text{arc } QS) + m(\text{arc } PR)] = \frac{1}{2} \times \square^\circ = 58°$ ..... (I)

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

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

ii. 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:



$\therefore$ By section formula,

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

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

$\therefore$ $= \frac{\square + 4}{4}$ $= \frac{\square - 3}{4}$

$\therefore$ $x = \square$ $\therefore y = \square$

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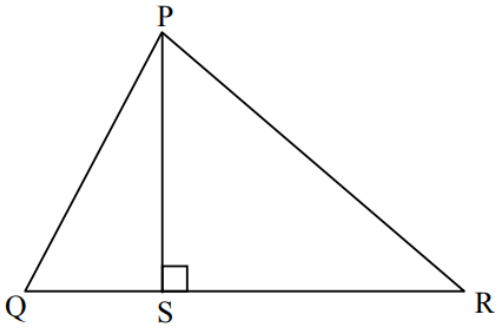
Q.3. A. Complete the following activities and rewrite it (Any one): **[3]**

1.



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

Activity:

In ΔPSQ, ∠PSQ = 90°

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

∴ $PS^2 = PQ^2 -$ ☐ ..... (I)

Similarly,

In ΔPSR, ∠PSR = 90°

∴ $PS^2 +$ ☐ $= PR^2$ ..... (Pythagoras theorem)

∴ $PS^2 = PR^2 -$ ☐ ..... (II)

∴ $PQ^2 -$ ☐ = ☐ $- RS^2$ ..... from (I) and (II)

∴ $PQ^2 +$ ☐ $= PR^2 + QS^2$

2. 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 = θ = 36°

Length of arc = l = 176 cm

∴ Length of arc (l) = $\frac{\theta}{360} \times$ ☐ ..... (formula)

∴ ☐ $= \frac{36}{360} \times 2 \times \frac{22}{7} \times r$

∴ $176 = \frac{1}{\square} \times \frac{44}{7} \times r$

∴ $r = \frac{176 \times \square}{44}$

∴ $r =$ ☐ $\times 70$

Radius of circle (r) = ☐ cm

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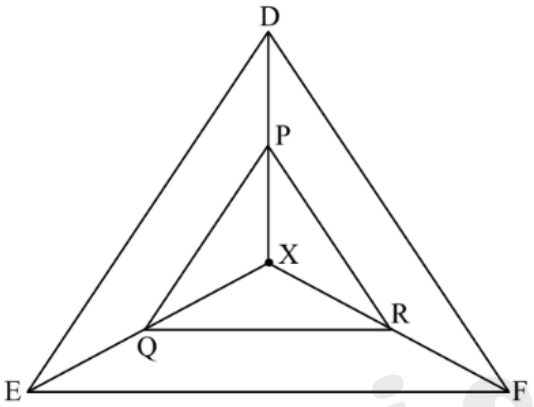
Q.3. A. Complete and write the following activities (Any *one*): **[3]**

i.



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 || DE …(Given)

∴ $\frac{XP}{PD} = \frac{\square}{QE}$ …(Basic proportionality theorem)…(i)

In ΔXEF,

QR || EF …(Given)

∴ $\frac{XQ}{\square} = \frac{XR}{\square}$ …(□)…(ii)

∴ $\frac{XP}{PD} = \frac{\square}{\square}$ …[From (i) and (ii)]

∴ seg PR || seg DF …(By converse of basic proportionality theorem)

ii. If A(6, 1), B(8, 2), C(9, 4) and D(7, 3) are the vertices of □ABCD, show that □ABCD is a parallelogram.

Solution:

Slope of line = $\frac{y_2 - y_1}{x_2 - x_1}$

∴ Slope of line AB = $\frac{2-1}{8-6} = \square$ …(i)

∴ Slope of line BC = $\frac{4-2}{9-8} = \square$ …(ii)

∴ Slope of line CD = $\frac{3-4}{7-9} = \square$ …(iii)

∴ Slope of line DA = $\frac{3-1}{7-6} = \square$ …(iv)

∴ Slope of line AB = □ …[From (i) and (iii)]

∴ line AB || line CD

∴ Slope of line BC = □ …[From (ii) and (iv)]

∴ line BC || line DA

Both the pairs of opposite sides of the quadrilateral are parallel.

∴ □ABCD is a parallelogram.

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(B) Solve the following subquestions (any *two*): **[6]**

i. Find co-ordinates of point P, if P divides the line segment joining the points A(–1, 7) and B(4, –3) in the ratio 2 : 3.

ii. Draw a circle with centre O of radius 3.4 cm. Draw a chord MN of length 5.7 cm in it. Construct tangents at point M and N to the circle.

iii. A strorm broke a tree and the treetop rested 20 m from the base of the tree, making an angle of 60° with the horizontal. Find the height of the tree.

iv. Prove that, 'In a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of remaining two sides'.

(B) Solve the following sub-questions (any *two*): **[6]**

i. Show that points P(1, – 2), Q(5, 2), R(3, – 1), S(– 1, – 5) are the vertices of a parallelogram.

ii. Prove that tangent segments drawn from an external point to a circle are congruent.

iii. Draw a circle with radius 4.1 cm. Construct tangents to the circle from a point at a distance 7.3 cm from the centre.

iv. How many solid cylinders of radius 10 cm and height 6 cm can be made by melting a solid sphere of radius 30 cm?

(B) Solve any two of the following sub-questions: **[6]**

1. Determine whether the points are collinear.
   A(1, –3), B(2, –5), C(–4, 7)

2. $\Delta ABC \sim \Delta LMN$. In ΔABC, AB = 5.5 cm, BC = 6 cm, CA = 4.5 cm. Construct ΔABC and ΔLMN such that $\frac{BC}{MN} = \frac{5}{4}$.

3. Seg PM is a median of ΔPQR, PM = 9 and $PQ^2 + PR^2 = 290$, then find QR.

4. Prove that, 'If a line parallel to a side of a triangle intersects the remaining sides in two distinct points, then the line divides the side in the same proportion.'

(B) Solve the following sub-questions (any *two*): **[6]**

1. The radius of a circle is 6 cm, the area of a sector of this circle is 15 π sq.cm. Find the measure of the arc and the length of the arc corresponding to that sector.

2. If A(3, 5) and B(7, 9), point Q divides seg AB in the ratio 2 : 3, find the co-ordinates of point Q.

3. Prove that :
   "In a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of remaining two sides."

4. $\Delta PQR \sim \Delta LTR$. In ΔPQR, PQ = 4.2 cm, QR = 5.4 cm, PR = 4.8 cm. Construct ΔPQR and ΔLTR such that $\frac{PQ}{LT} = \frac{3}{4}$.

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(B) Solve the following sub-questions (any *two*): **[6]**

1. In ΔABC, seg AP is a median. If BC = 18, $AB^2 + AC^2 = 260$, find AP.
2. Prove that, "Angles inscribed in the same are congruent".
3. Draw a circle of radius 3.3 cm. Draw a chord PQ of length 6.6 cm. Draw tangents to the circle at points P and Q.
4. The radii of circular ends of a frustum are 14 cm and 6 cm respectively and its height is 6 cm. Find its curved surface area. ($\pi = 3.14$)

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(B) Solve the following sub-questions (any *two*): **[6]**

i. Prove that $\sec\theta + \tan\theta = \frac{\cos\theta}{1-\sin\theta}$.

ii. Find the coordinates of centroid of the triangle whose vertices are (4, 7), (8, 4), (7, 11).

iii. Prove that "Opposite angles of a cyclic quadrilateral are supplementary".

iv. Draw a circle with centre O and radius 3.5 cm. take a point P at a distance 7.5 cm from the centre. Draw tangents to the circle from point P.

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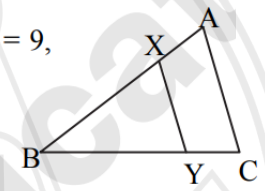
(B) Solve the following sub-questions (any *two*): **[6]**

i. In ΔABC, seg XY || side AC. If 2AX = 3BX and XY = 9, then find the value of AC.



ii. Prove that, "Opposite angles of cyclic quadrilateral are supplementary".

iii. ΔABC ~ ΔPQR. In ΔABC, AB = 5.4 cm, BC = 4.2 cm, AC = 6.0 cm, AB : PQ = 3 : 2, then construct ΔABC and ΔPQR

iv. Show that: $\frac{\tan A}{(1+\tan^2 A)^2} + \frac{\cot A}{(1+\cot^2 A)^2} = \sin A \times \cos A$.

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B. Solve the following sub-questions (Any two): **[6]**

1. Prove that, "The ratio of the intercepts made on a transversal by three parallel lines is equal to the ratio of the corresponding intercepts made on any other transversal by the same parallel lines."
2. Draw a circle with centre 'O' and radius 3.4 cm. Draw a chord MN of length 5.7 cm in it. Construct tangents at points M and N to the circle.
3. Prove that:
$\frac{1}{\sec\theta - \tan\theta} = \sec\theta + \tan\theta$.
4. Radii of the top and base of frustum are 14 cm and 8 cm respectively. Its height is 8 cm. Find its curved surface area.($\pi = 3.14$)

March 2020 www.saiphy.com

B. Solve the following sub-questions (Any *two*): **[6]**

i. If ΔPQR, point S is the mid-point of side QR. If PQ = 11, PR = 17, PS = 13, find QR.

ii. Prove that, tangent segments drawn from an external point to the circle are congruent.

iii. Draw a circle with radius 4.1 cm. Construct tangents to the circle from a point at a distance 7.3 cm from the centre.

iv. A metal cuboid of measures 16 cm × 11 cm × 10 cm was melted to make coins. How many coins were made, if the thickness and diameter of each coin was 2 mm and 2 cm respectively? ($\pi = 3.14$)

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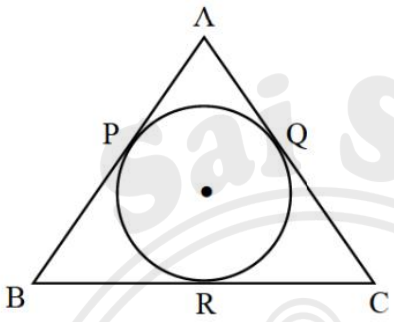
Q.4. Solve the following subquestions (any *two*): **[8]**

i. ΔABC has sides of length 4 cm, 5 cm and 6 cm while ΔPQR has perimeter of 90 cm. If ΔABC is similar to ΔPQR, then find the length of corresponding sides of ΔPQR.

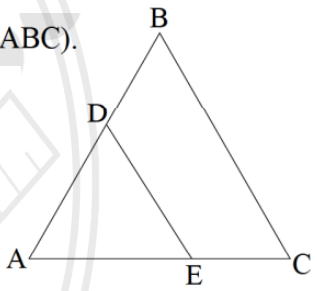
ii. $\Delta ABC \sim \Delta PBR$, BC = 8 cm, AC = 10 cm, $\angle B = 90°$, $\frac{BC}{BR} = \frac{5}{4}$, then construct ΔPBR.

iii. In the following figure ΔABC is an isosceles triangle with perimeter 44 cm. The base BC is of length 12 cm. Side AB and AC are congruent. A circle touches the three sides of triangle as shown. Find the length of tangent segment from A to circle.



Q.4. Solve the following sub-questions (*any two*): **[8]**

i. In the following figure DE || BC, then:
   a. If DE = 4 cm, BC = 8 cm, A(ΔADE) = 25 cm^2, find A (ΔABC).
   b. If DE : BC = 3 : 5, then find A(ΔADE) : A(□DBCE).



ii. $\Delta ABC \sim \Delta PQR$. In ΔABC, AB = 3.6 cm, BC = 4 cm and AC = 4.2 cm. The corresponding sides of ΔABC and ΔPQR are in the ratio 2 : 3, construct ΔABC and ΔPQR.

iii. The radii of the circular ends of a frustum of a cone are 14 cm and 8 cm. If the height of the frustum is 8 cm, find: ($\pi = 3.14$)
   a. Curved surface area of frustum.
   b. Total surface area of the frustum.
   c. Volume of the frustum.

Q.4. Solve any *two* of the following sub-questions: **[8]**

1. $\frac{1}{\sin^2\theta} - \frac{1}{\cos^2\theta} - \frac{1}{\tan^2\theta} - \frac{1}{\cot^2\theta} - \frac{1}{\sec^2\theta} - \frac{1}{\operatorname{cosec}^2\theta} = -3$, then find the value of θ.

2. A cylinder of radius 12 cm contains water up to the height 20 cm. A spherical iron ball is dropped into the cylinder and thus water level raised by 6.75 cm. What is the radius of iron ball?

3. Draw a circle with centre O having radius 3 cm. Draw tangent segments PA and PB through the point P outside the circle such that $\angle APB = 70°$.

Q.4. Solve the following sub-questions (any *two*): **[8]**

1. A bucket is in the form of a frustum of a cone. It holds 28.490 litres of water. The radii of the top and the bottom are 28 cm and 21 cm respectively. Find the height of the bucket. $\left(\pi = \frac{22}{7}\right)$

2. Draw a circle with centre P and radius 3 cm. Draw a chord MN of length 4 cm. Draw tangents to the circle through points M and N which intersect in point Q. Measure the length of seg PQ.

3. In ΔPQR, bisectors of ∠Q and ∠R intersect in point X. Line PX intersects side QR in point Y, then prove that: $\frac{PQ + PR}{QR} = \frac{PX}{XY}$.

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Q.4. Solve the following sub-questions (any *two*): **[8]**

1. In ΔABC, seg DE ∥ side BC. If 2A (ΔADE) = A (□ DBCE), find AB : AD and show that BC = $\sqrt{3}$ DE.

2. ΔSHR ~ ΔSVU. In ΔSHR, SH = 4.5 cm, HR = 5.2 cm, SR = 5.8 cm and $\frac{SH}{SV} = \frac{3}{5}$, construct ΔSVU.

3. An ice-cream pot has a right circular cylindrical shape. The radius of the base is 12 cm and height is 7 cm. This pot is completely filled with ice-cream. The entire ice-cream is given to the students in the form of right circular ice-cream cones, having diameter 4 cm and height is 3.5 cm. If each student is given one cone, how many students can be served?

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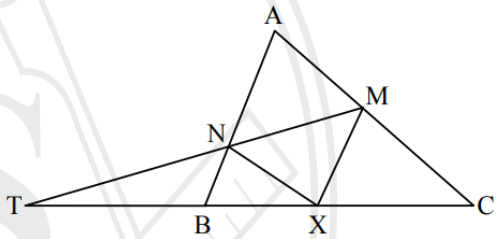
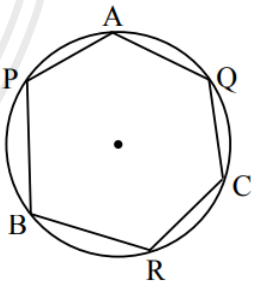
Q.4. Solve the following sub-questions (any *two*): **[8]**

i. In ΔABC, point X is any point on side BC.
seg XM ∥ seg AB and seg XN ∥ seg AC.
Extend seg MN such that it intersects extended side CB in point T.
Then prove that $TX^2 = TB \times TC$.



ii. Draw triangle ABC, right angle at B such that AB = 3 cm, BC = 4 cm. Now construct ΔPBQ similar to ΔABC each of whose sides are $\frac{7}{4}$ times the corresponding sides of ΔABC.

iii. In the given figure, points A, P, B, R, C, Q are on the circle. After joining the given points as shown in the figure it from hexagon, then prove that ∠APB + ∠BRC = 360° – ∠AQC.



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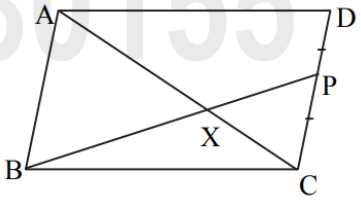
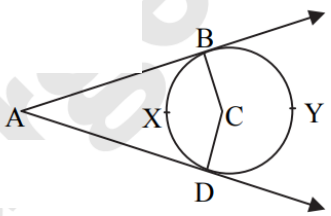
Q.4. Solve the following sub-questions (any *two*): **[8]**

i. □ABCD is a parallelogram. Point P is the midpoint of side CD. Seg BP intersects diagonal AC at point X, then prove that:
3AX = 2AC



ii.

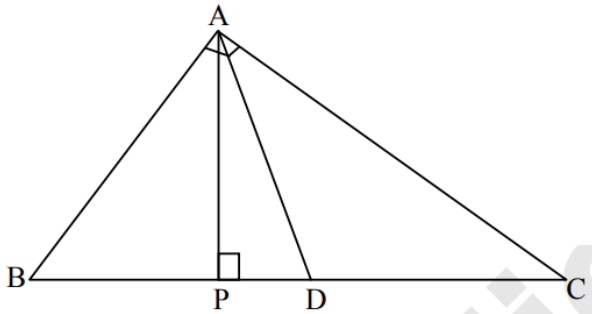


In the above figure, seg AB and seg AD are tangent segments drawn to a circle with centre C from exterior point A, then prove that: $\angle A = \frac{1}{2}$ [m(arc BYD) – m(arc BXD)]

iii. Find the co-ordinates of centroid of a triangle if points D(–7, 6), E(8, 5) and F(2,–2) are the mid-points of the sides of that triangle.

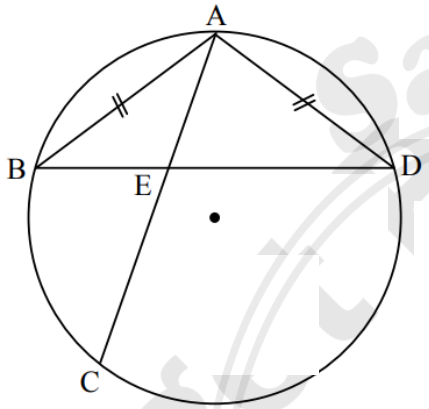
Q.4. Solve the following sub-questions (Any two): **[8]**

1.



In ΔABC, ∠BAC = 90°, seg AP ⊥ side BC, B-P-C. Point D is the mid-point of side BC, then prove that $2AD^2 = BD^2 + CD^2$.

2.



In the above figure, chord AB ≅ chord AD. Chord AC and chord BD intersect each other at point E. Then prove that:
$AB^2 = AE \times AC$.

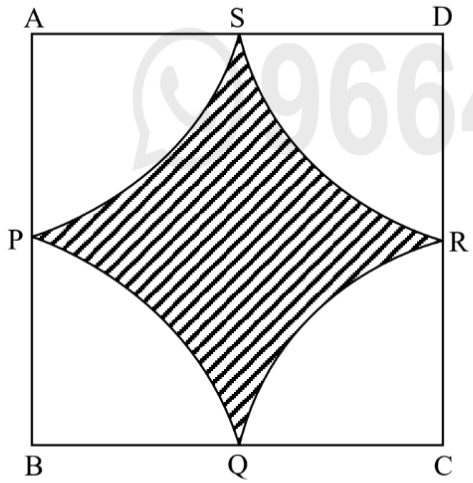
3. A straight road leads to the foot of the tower of height 48 m. From the top of the tower the angles of depression of two cars standing on the road are 30° and 60° respectively. Find the distance between the two cars.($\sqrt{3} = 1.73$)

Q.4. Solve the following sub-questions (Any *two*): **[8]**

i. In ΔABC, PQ is a line segment intersecting AB at P and AC at Q such that seg PQ || seg BC. If PQ divides ΔABC into two equal parts having equal areas, find $\frac{BP}{AB}$.

ii. Draw a circle of radius 2.7 cm and draw a chord PQ of length 4.5 cm. Draw tangents at points P and Q without using centre.

iii.



In the figure given above □ABCD is a square of side 50 m. Points P, Q, R, S are midpoints of side AB, side BC, side CD, side AD respectively. Find area of shaded region.

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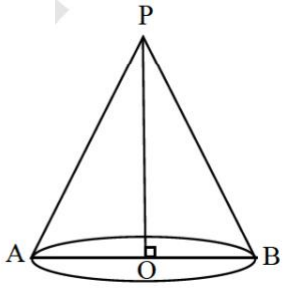
Q.5. Solve the following subquestions (any *one*): [3]

i. Draw right-angled ΔABC of lengths of sides are 3 cm, 4 cm and 5 cm.
Draw median on the hypotenuse of ΔABC.
Then:
a. Measure the length of median and write it.
b. By observing lengths of median and hypotenuse write your observations.

ii. Observe the given figure and answer the following questions:
a. How many surfaces does a solid cone have?
b. What are the names of slant height and perpendicular height in the given figure?
c. If slant height of solid cone is 10 cm and perpendicular height is 8 cm, then find diameter of base of solid cone?



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Q.5. Solve the following sub-questions (any *one*): [3]

i. □ABCD is a rectangle. Taking AD as a diameter, a semicircle AXD is drawn which intersects the diagonal BD at X. If AB = 12 cm, AD = 9 cm, then find the values of BD and BX.

ii. Taking $\theta = 30^\circ$ to verify the following Trigonometric identities:
a. $\sin^2\theta + \cos^2\theta = 1$
b. $1 + \tan^2\theta = \sec^2\theta$
c. $1 + \cot^2\theta = \operatorname{cosec}^2\theta$.

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Q.5. Solve any *one* of the following sub-questions: [3]

1. □ABCD is trapezium, AB || CD diagonals of trapezium intersects in point P.
Write the answers of the following questions:
a. Draw the figure using given information.
b. Write any one pair of alternate angles and opposite angles.
c. Write the names of similar triangles with test of similarity.

2. AB is a chord of a circle with centre O. AOC is diameter of circle, AT is a tangent at A.
Write answers of the following questions:
a. Draw the figure using given information.
b. Find the measures of ∠CAT and ∠ABC with reasons.
c. Whether ∠CAT and ∠ABC are congruent? Justify your answer.

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Q.5. Solve the following sub-questions (Any *one*): [3]

1. From top of the building, Ramesh is looking at a bicycle parked at some distance away from the building on the road.
If
AB → Height of building is 40 m
C → Position of bicycle
A → Position of Ramesh on top of the building
∠MAC is the angle of depression and $m\angle MAC = 30°$, then:
(a) Draw a figure with the given information.
(b) Find the distance between building and the bicycle. $\left(\sqrt{3} = 1.73\right)$.

2. □ABCD is a cyclic quadrilateral where side AB ≅ side BC, ∠ADC = 110°, AC is the diagonal, then:
(a) Draw the figure using given information
(b) Find measure of ∠ABC
(c) Find measure of ∠BAC
(d) Find measure of (arc ABC).

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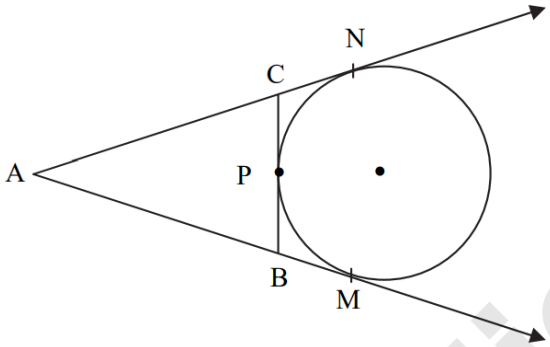
Q.5. Solve the following sub-questions (any *one*): [3]

1.



A circle touches side BC at point P of the ΔABC, from out-side of the triangle. Further extended lines AC and AB are tangents to the circle at N and M respectively.

Prove that: AM = $\frac{1}{2}$ (Perimeter of ΔABC)

2. Eliminate θ if $x = r\cos\theta$ and $y = r\sin\theta$.

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Q.5. Solve the following sub-questions (Any *one*): [3]

i. ΔABC and ΔPQR are equilateral triangles with altitudes $2\sqrt{3}$ and $4\sqrt{3}$ respectively, then:
   a. Find the length of side AB and side PQ
   b. Find $\frac{A(\Delta ABC)}{A(\Delta PQR)}$
   c. Find the radio of perimeter of ΔABC to the perimeter of ΔPQR.

ii. In a circle with centre O, PA and PB are tangents from an external point P. E is the point on the circle such that O-E-P. Tangent drawn at E intersects PA and PB in point C and D respectively. If PA = 10, then write the answers to the following questions:
   a. Draw the suitable figure using given information.
   b. Write the relation between seg PA and seg PB
   c. Find the perimeter of ΔPCD.

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Q.5. Solve the following sub-questions (any *one*): [3]

i. If a and b are natural numbers and a > b. If $(a^2 + b^2)$, $(a^2 - b^2)$ and 2ab are the sides of the triangle, then prove that the triangle is right angled.
Find out two Pythagorean triplets by taking suitable values of a and b.

ii. Construct two concentric circles with centre O with radii 3 cm and 5 cm. Construct tangent to a smaller circle from any point A on the larger circle. Measure and write the length of tangent segment. Calculate the length of tangent segment using Pythagoras theorem.

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Q.5. Solve the following sub-questions (Any one): [3]

i. Let M be a point of contact of two internally touching circles. Let line AMB be their common tangent. The chord CD of the bigger circle touches the smaller circle at point N. The chord CM and chord DM of bigger circle intersect the smaller circle at point P and R respectively.
   a. From the above information draw the suitable figure.
   b. Draw seg NR and seg NM and write the two pairs of congruent angles in smaller circle considering tangent and chord.
   c. By using the property which is used in (b) write the two pairs of congruent angles in the bigger circle.

ii. Draw a circle with centre 'O' and radius 3 cm. Draw a tangent segment PA having length $\sqrt{40}$ cm from an exterior point P.

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Q.5. Solve the following sub-questions (Any *one*): [3]

i. Circles with centres A, B and C touch each other externally. If AB = 3 cm, BC = 3 cm, CA = 4 cm, then find the radii of each circle.

ii. If $\sin\theta + \sin^2\theta = 1$
show that: $\cos^2\theta + \cos^4\theta = 1$