N 832

Seat No. ☐☐☐☐☐☐☐

2025 III 07 1100 – N 832– MATHEMATICS (71) GEOMETRY—PART II (E)

(REVISED COURSE)

Time : 2 Hours **(Pages 12)** **Max. Marks : 40**

Note :—

(*i*) *All* questions are compulsory.

(*ii*) Use of a calculator is not allowed.

(*iii*) The numbers to the right of the questions indicate full marks.

(*iv*) In case of MCQs [Q. No. **1(A)**] only the first attempt will be evaluated and will be given credit.

(*v*) Draw proper figures wherever necessary.

(*vi*) The marks of construction should be clear. Do not erase them.

(*vii*) Diagram is essential for writing the proof of the theorem.

1. (A) Choose the correct alternative from given : **4**

(1) 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)

P.T.O.

(2) $\angle ACB$ is inscribed angle in a circle with centre O. If $\angle ACB = 65^\circ$, then what is measure of its intercepted arc AXB ?

(A) 65°

(B) 230°

(C) 295°

(D) 130°

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

(A) 7

(B) 1

(C) 5

(D) –5

(4) If radius of cone is 5 cm and its perpendicular height is 12 cm, then the slant height is ....

(A) 17 cm

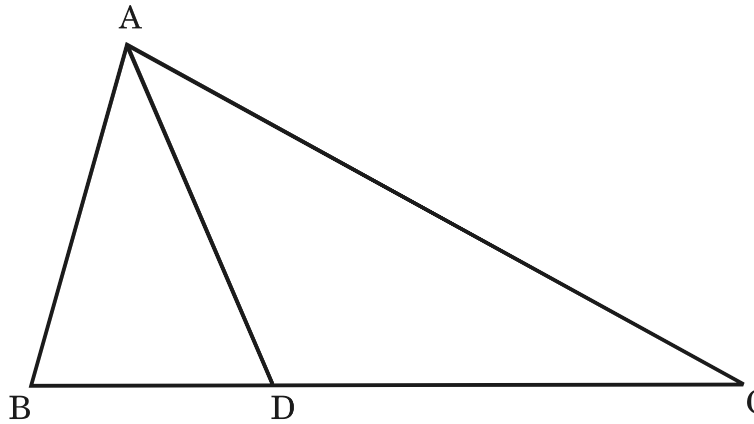
(B) 4 cm

(C) 13 cm

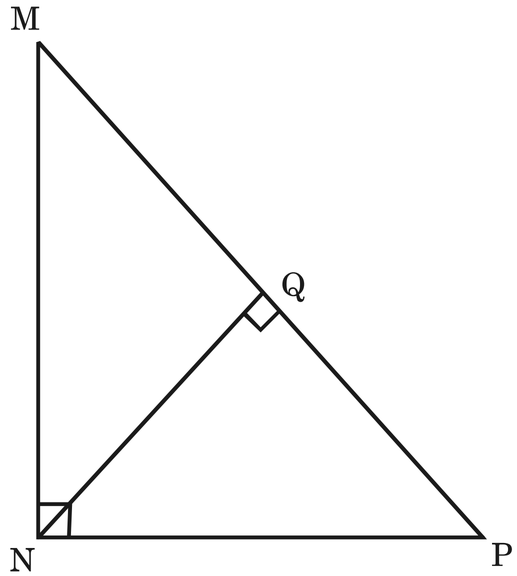
(D) 60 cm

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

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



(2) In the following figure $\angle MNP = 90^\circ$, seg NQ $\perp$ seg MP, MQ = 9, QP = 4, find NQ.



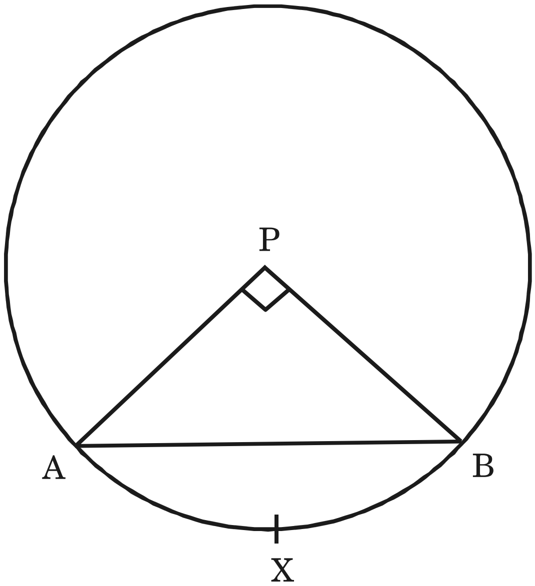
(3) Angle made by a line with the positive direction of X-axis is 30º. Find slope of that line.

(4) In cyclic quadrilateral ABCD $m\angle A = 100^\circ$, then find $m\angle C$.

P.T.O.

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

(1) 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. (π = 3.14)



Activity :

r = 10 cm, θ = 90°, π = 3.14.

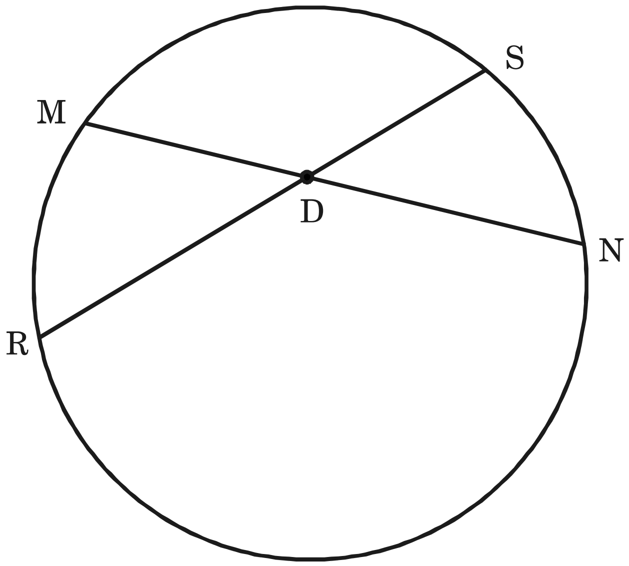
$$A(P\text{–}AXB) = \frac{\theta}{360} \times \boxed{}$$

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

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

$$A\,(P\text{–}AXB) = \boxed{} \text{ sq. cm.}$$

(2) 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 ....

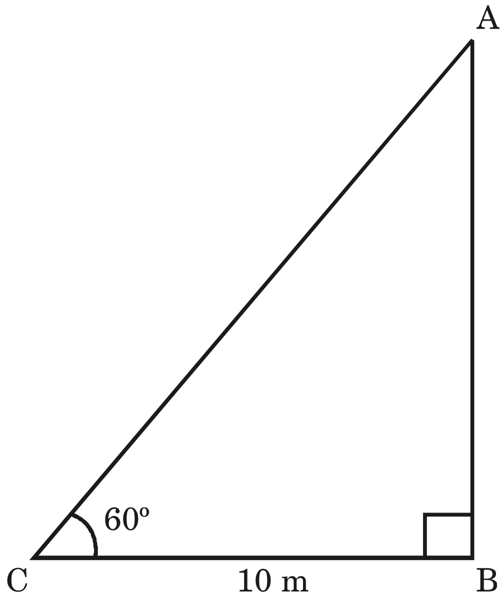
.... (Theorem of internal division of chords)

$\therefore$ $\square$ × DN = 15 × 4

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

$\therefore$ DN = $\square$

(3) 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. ($\sqrt{3} = 1.73$)



Activity :

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

Angle of elevation (θ) = $\angle BCA$ = 60°

$$\tan\theta = \frac{\square}{BC} \quad \text{..................} \quad (I)$$

$$\tan 60^\circ = \square \quad \text{..................} \quad (II)$$

$$\frac{AB}{BC} = \sqrt{3} \qquad \text{(From (I) and (II))}$$

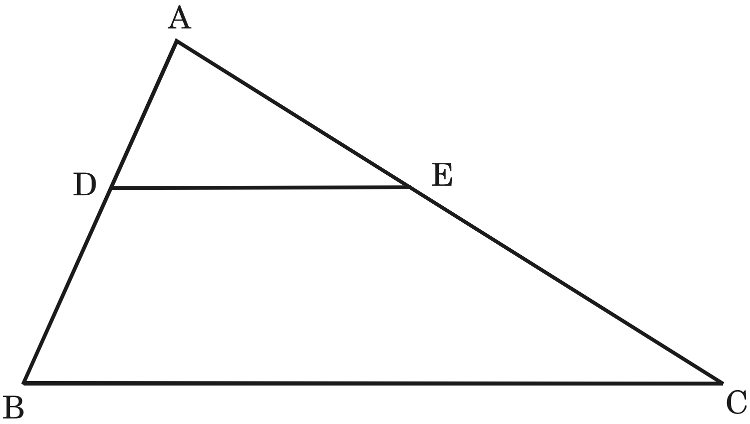
$$AB = BC \times \sqrt{3} = 10\sqrt{3}$$

$$AB = 10 \times 1.73 = \square$$

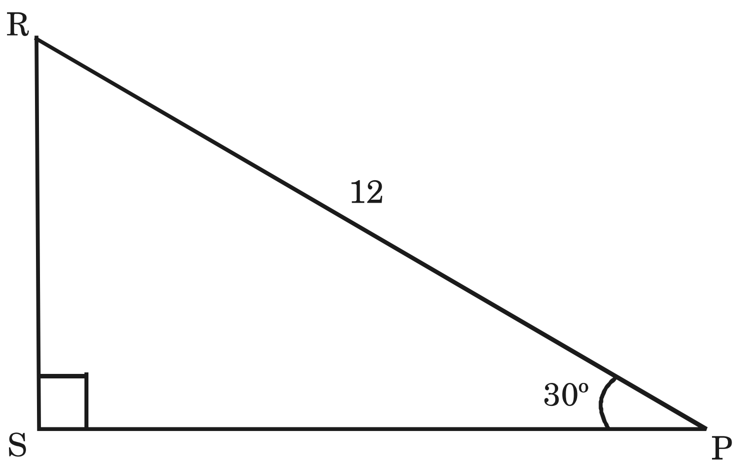
$\therefore$ height of the tree is $\square$ m.

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

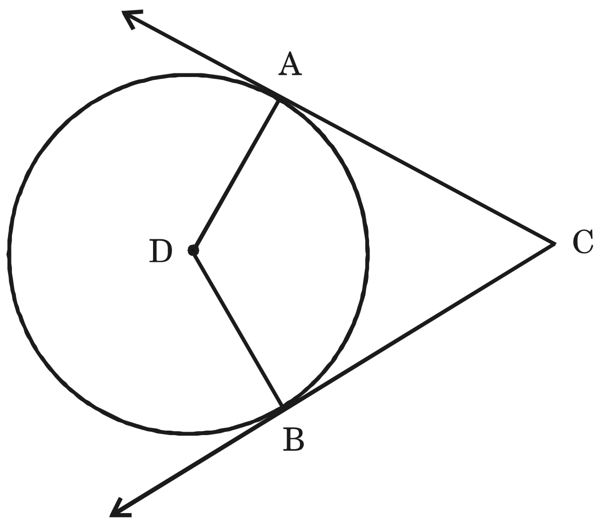
(1) In Δ ABC, DE || BC. If DB = 5.4 cm, AD = 1.8 cm, EC = 7.2 cm, then find AE.



(2) In the figure given below, find RS and PS using the information given in ΔPSR.



(3) In the following figure, circle with centre D touches the sides of $\angle ACB$ at A and B. If $\angle ACB = 52^\circ$, find measure of $\angle ADB$.

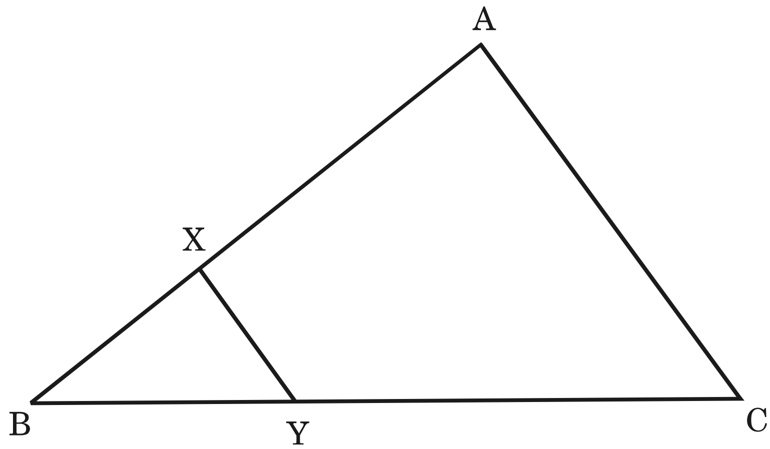


(4) Verify, whether points, A(1, –3), B(2, –5) and C(–4, 7) are collinear or not.

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

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

(1) 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)

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

$\frac{AX+BX}{BX} = \frac{3+2}{2}$ .... (by componendo)

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

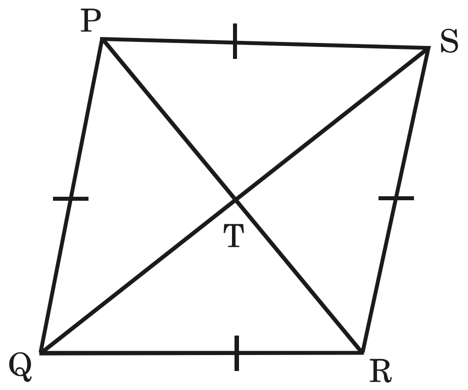
Now $\Delta BCA \sim \Delta BYX$ .... ($\boxed{}$ test of similarity)

$\therefore \quad \frac{BA}{BX} = \frac{AC}{XY}$ .... (corresponding sides of similar triangles)

$\frac{\boxed{}}{\boxed{}} = \frac{AC}{9}$ .... from (I)

$\therefore \quad AC = \boxed{}$

(2) 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.



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Given :

$\square$ 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,

$PQ^2 + PS^2 = \boxed{} + 2QT^2$ .... (I)

$QR^2 + SR^2 = \boxed{} + 2QT^2$ .... (II)

adding (I) and (II),

$PQ^2 + PS^2 + QR^2 + SR^2 = 2(PT^2 + \boxed{}) + 4QT^2$

$= 2(PT^2 + \boxed{}) + 4QT^2$

.... (RT = PT)

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

$= (\boxed{})^2 + (2QT)^2$

$\therefore$ $PQ^2 + PS^2 + QR^2 + SR^2 = PR^2 + \boxed{}$.

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

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

(2) Prove that tangent segments drawn from an external point to a circle are congruent.

(3) 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.

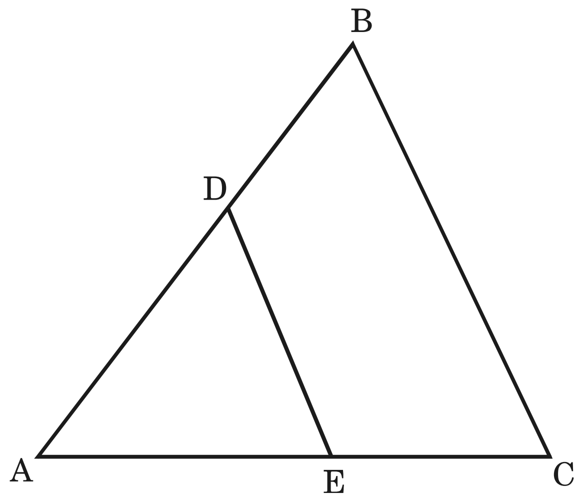
(4) How many solid cylinders of radius 10 cm and height 6 cm can be made by melting a solid sphere of radius 30 cm ?

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

(1) In the following figure $DE \parallel BC$, then :

(*i*) If DE = 4 cm, BC = 8 cm, A(Δ ADE) = 25 cm^2, find A(Δ ABC).

(*ii*) If DE : BC = 3 : 5, then find A(Δ ADE) : A($\square$ DBCE).



P.T.O.

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

(3) 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 : ($\pi = 3.14$)

(*i*) Curved surface area of frustum.

(*ii*) Total surface area of the frustum.

(*iii*) Volume of the frustum.

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

(1) $\square$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.

(2) Taking $\theta = 30°$ to verify the following Trigonometric identities :

(*i*) $\sin^2\theta + \cos^2\theta = 1$

(*ii*) $1 + \tan^2\theta = \sec^2\theta$

(*iii*) $1 + \cot^2\theta = \text{cosec}^2\theta \cdot$