N 832

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)   ∠ACB is inscribed angle in a circle with centre O. If ∠ACB = 65º, then what is measure of its intercepted arc AXB ?

(A)   65º

(B)   230º

(C)   295º

(D)   130º

(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 ....
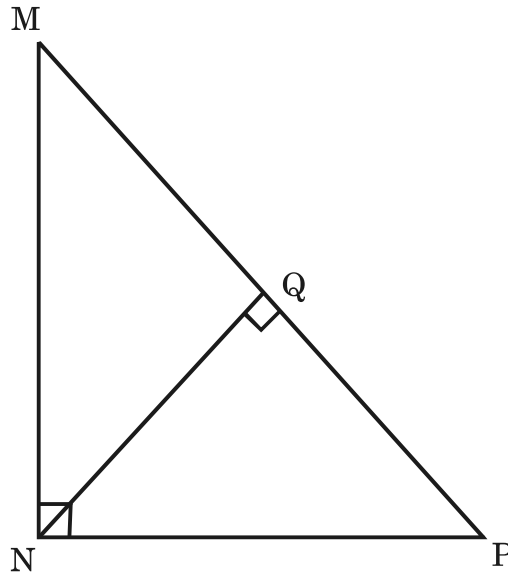
(A)   17 cm

(B)   4 cm

(C)   13 cm

(D)   60 cm

3/N 832

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

(1) In the following figure Δ ABC, B – D – C and BD = 7, BC = 20,

then find $\dfrac{A(\Delta\ ABD)}{A\ (\Delta\ ABC)}$.
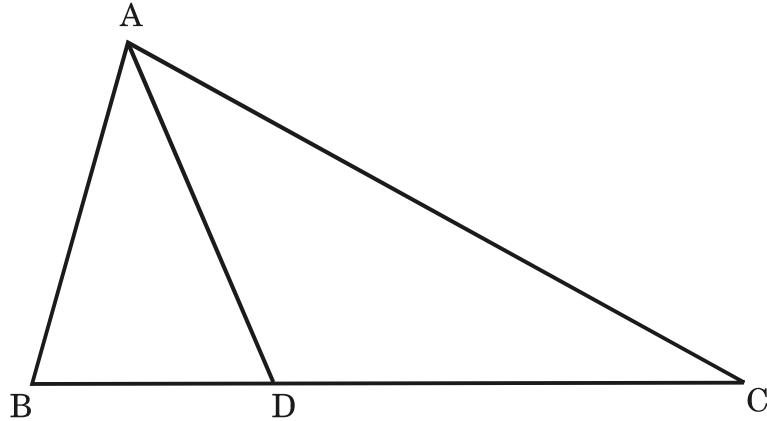
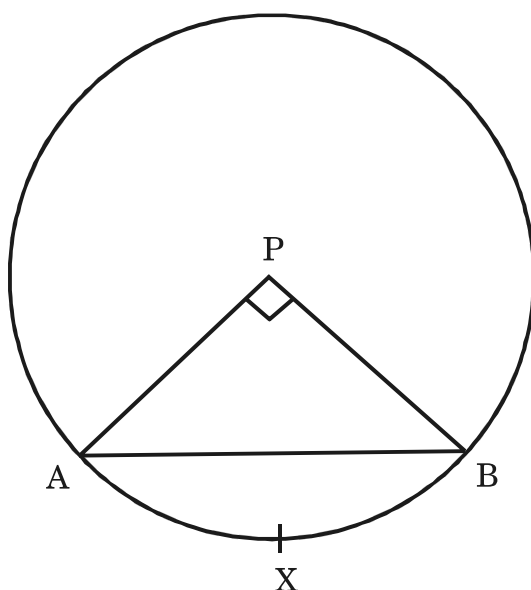(2) In the following figure ∠MNP = 90º, seg NQ ⊥ seg MP, MQ = 9, QP = 4, find NQ.

(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 $m\angle A = 100º$, 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.
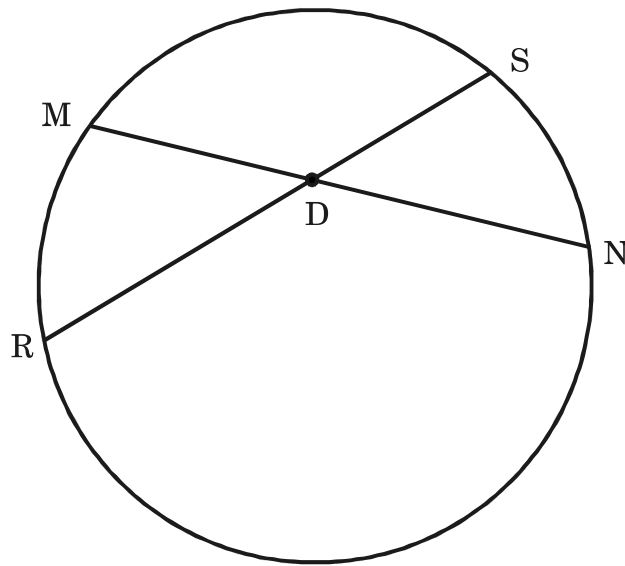
$$A(P–AXB) = \frac{\theta}{360} \times \boxed{}$$

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

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

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

5/N 832

(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 :

∴   MD × DN = ☐ × DS ....

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

∴   ☐ × DN = 15 × 4

∴   DN = $\dfrac{\boxed{}}{8}$

∴   DN = ☐

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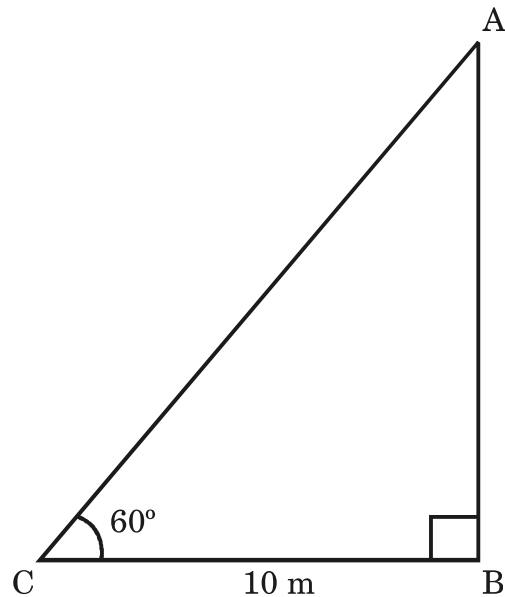
Activity :

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 = 60º

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

$$\tan 60º = \boxed{} \quad \text{................. (II)}$$

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

$$AB = BC \times \sqrt{3} = 10\sqrt{3}$$
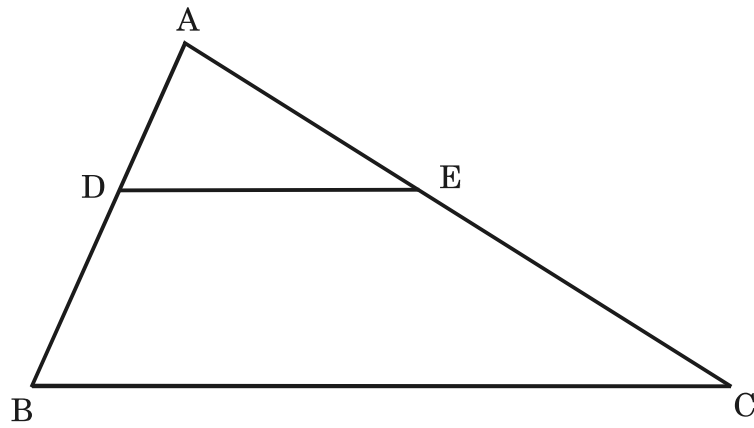
$$AB = 10 \times 1.73 = \boxed{}$$

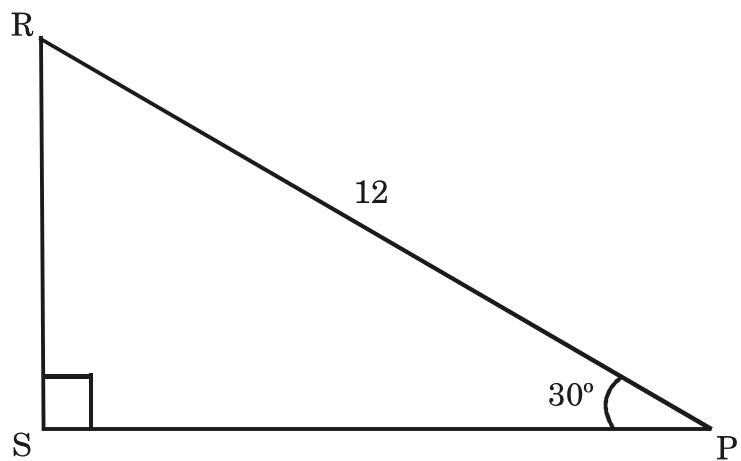$\therefore$ height of the tree is $\boxed{}$ m.

(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.

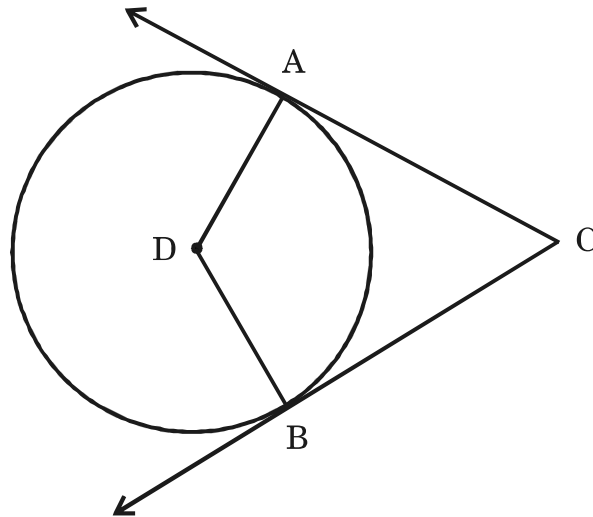(2) In the figure given below, find RS and PS using the information given in ΔPSR.

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

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

(5)   If $\sin\theta = \dfrac{11}{61}$, 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.
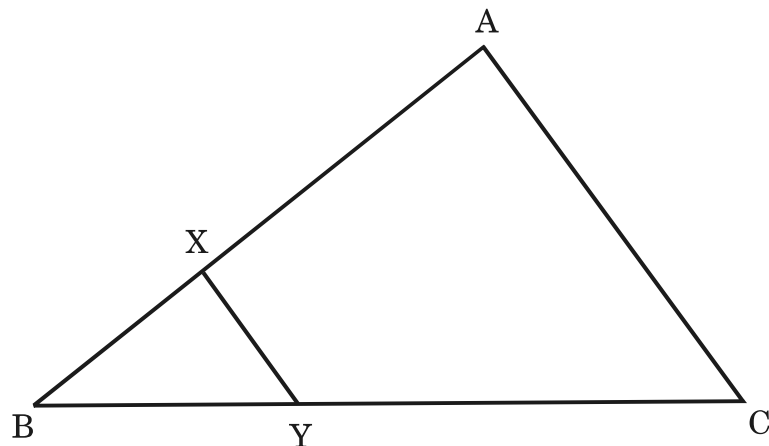
Activity :

2AX = 3BX (Given)

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

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

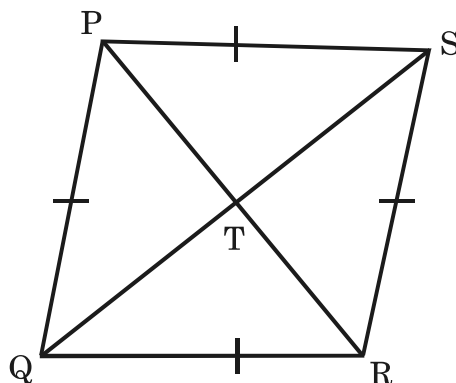$$\frac{\boxed{}}{BX} = \frac{5}{2} \quad .... \text{ (I)}$$

Now $\triangle$ BCA ~ $\triangle$ BYX .... ($\boxed{}$ test of similarity)

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

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

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

(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.

10/N 832

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 $\triangle PQS$, PT is the median and in $\triangle QRS$, 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)

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

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

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

(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).
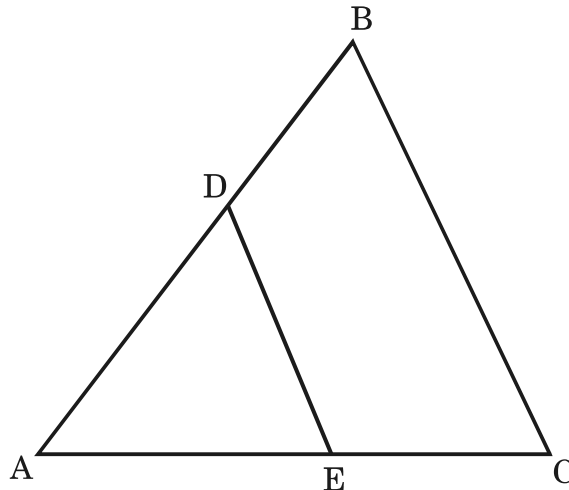
(2)   △ ABC ~ △ PQR. In △ ABC, AB = 3.6 cm, BC = 4 cm and AC = 4.2 cm. The corresponding sides of △ ABC and △ PQR are in the ratio 2 : 3, construct △ ABC and △ PQR.

(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 :   (π = 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)   ☐ 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 θ = 30º to verify the following Trigonometric identities :

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

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

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