

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 :

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(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)

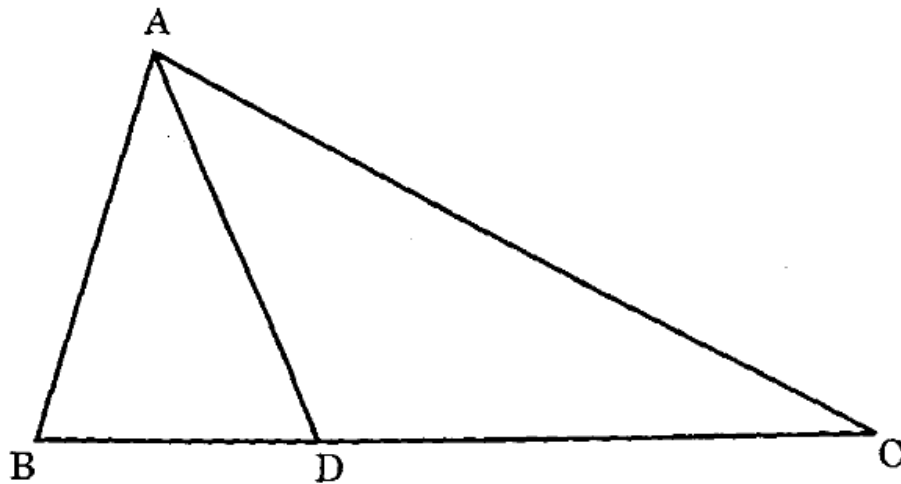
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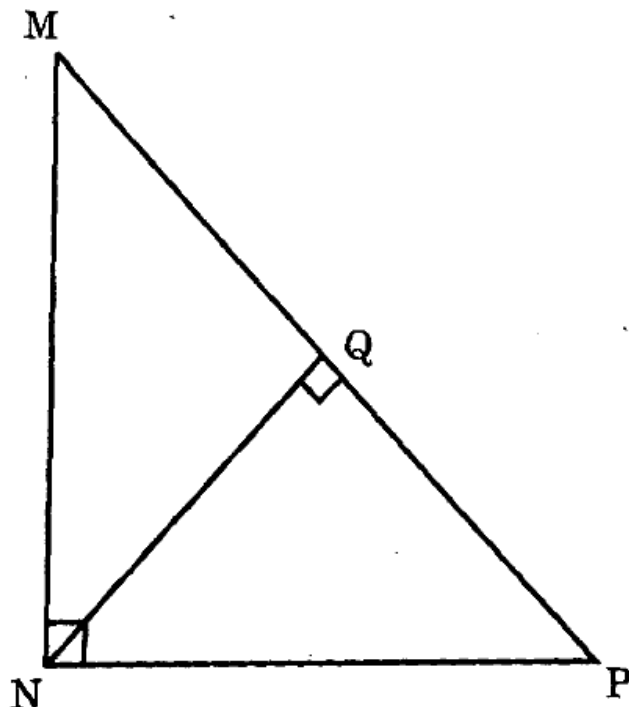
- (2) $\angle ACB$ is inscribed angle in a circle with centre O. If $\angle ACB = 65^\circ$, then what is measure of its intercepted arc AXB ?
- (A) 65°
- (B) 230°
- (C) 295°
- (D) 130°
- (3) Distance of point (3, 4) from the origin is
- (A) 7
- (B) 1
- (C) 5
- (D) -5
- (4) If radius of cone is 5 cm 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 :

- (1) In the following figure $\triangle ABC$, $B - D - C$ and $BD = 7$, $BC = 20$,
then find $\frac{A(\triangle ABD)}{A(\triangle ABC)}$.



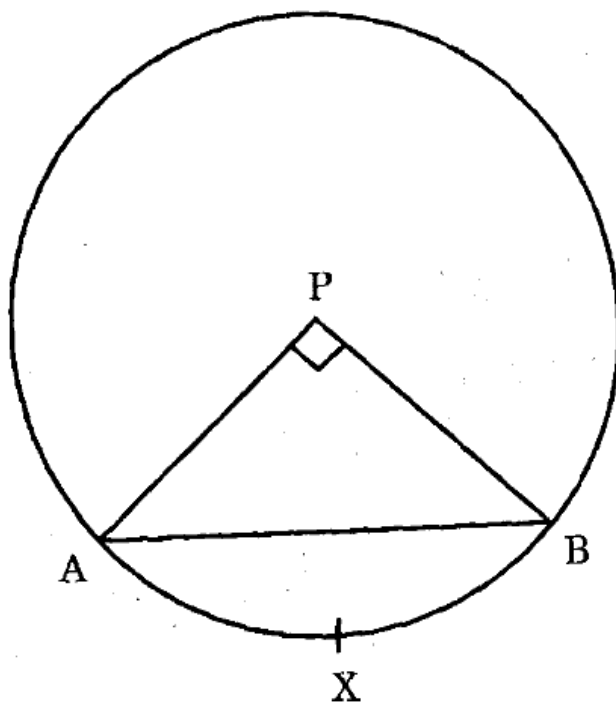
- (2) In the following figure $\angle MNP = 90^\circ$, seg $NQ \perp$ seg MP , $MQ = 9$,
 $QP = 4$, find NQ .



- (3) Angle made by a line with the positive direction of X-axis is 30° .
Find slope of that line.
- (4) In cyclic quadrilateral ABCD $m\angle A = 100^\circ$, then find $m\angle C$.

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. ($\pi = 3.14$)



Activity :

$$r = 10 \text{ cm}, \theta = 90^\circ, \pi = 3.14.$$

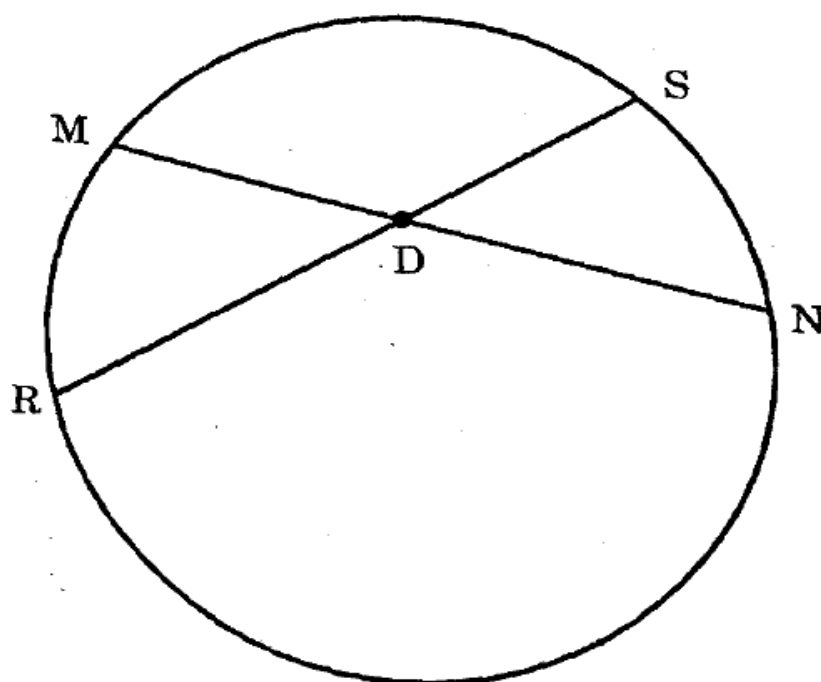
$$A(P\text{-}AXB) = \frac{\theta}{360} \times \boxed{10^2}$$

$$= \frac{\boxed{90}}{360} \times 3.14 \times 10^2$$

$$= \frac{1}{4} \times \boxed{314}$$

$$A(P\text{-}AXB) = \boxed{78.5} \text{ sq. cm.}$$

- (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 :

$$\therefore MD \times DN = \boxed{15} \times DS \dots\dots\dots$$

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

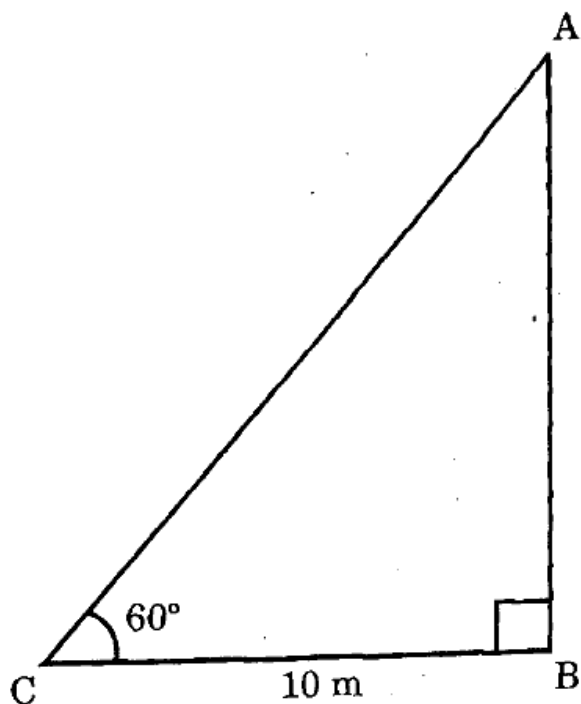
$$\therefore \boxed{8} \times DN = 15 \times 4$$

$$\therefore DN = \frac{\boxed{60}}{8}$$

$$\therefore DN = \boxed{7.5}$$

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- (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, $BC = 10$: distance of the observer from the tree.

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

$$\tan \theta = \frac{\boxed{}}{BC} \dots\dots\dots (I)$$

$$\tan 60^\circ = \boxed{} \dots\dots\dots (II)$$

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

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

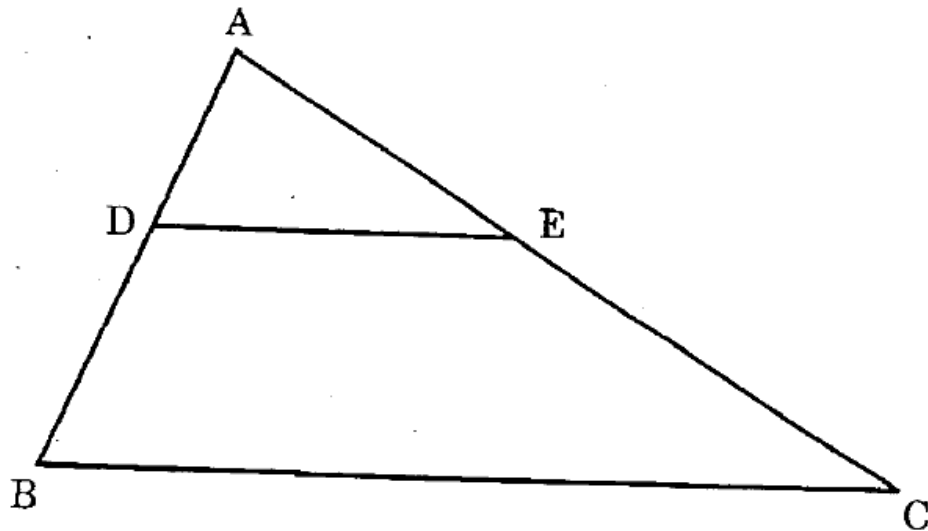
$$AB = 10 \times 1.73 = \boxed{}$$

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

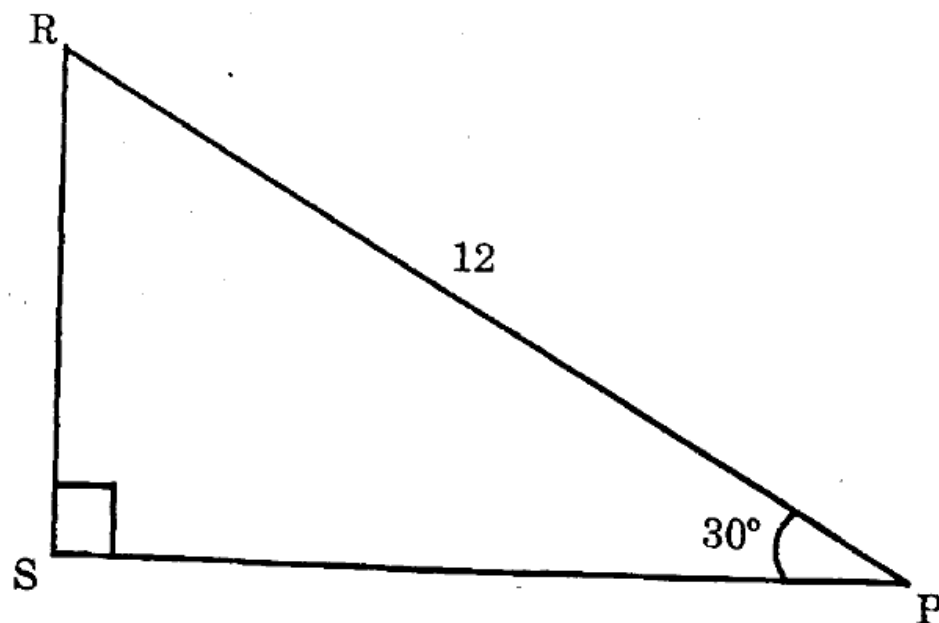
(B) Solve the following sub-questions (any four) :

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- (1) In $\triangle ABC$, $DE \parallel BC$. If $DB = 5.4$ cm, $AD = 1.8$ cm, $EC = 7.2$ cm, then find AE .

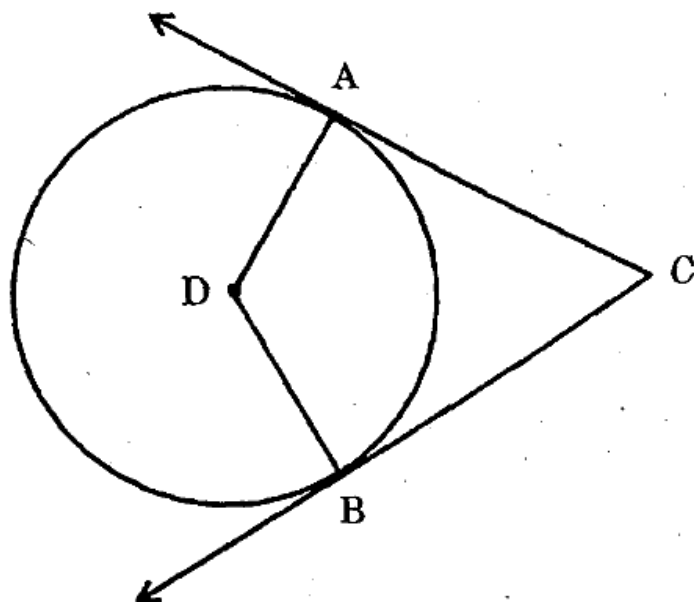


- (2) In the figure given below, find RS and PS using the information given in $\triangle PSR$.



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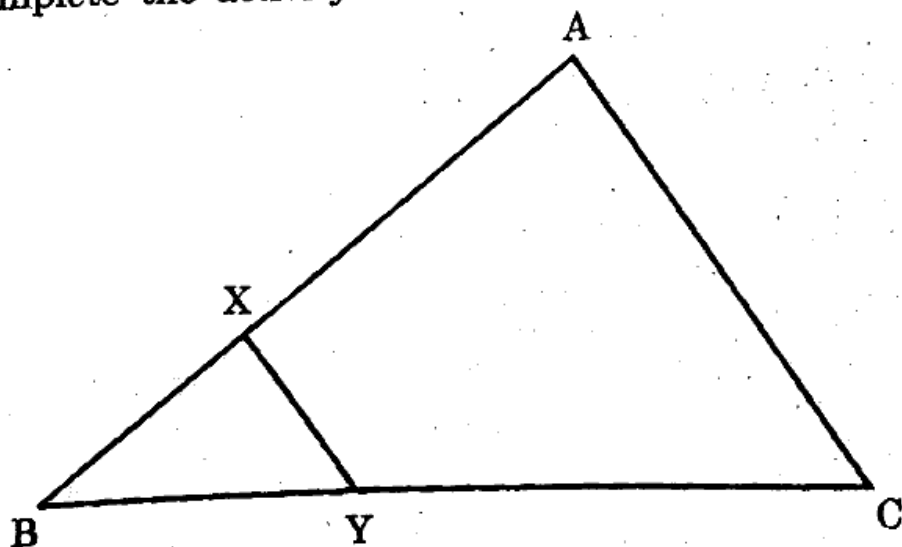
- (3) In the following figure, circle with centre D touches the sides of $\angle ACB$ at A and B. If $\angle ACB = 52^\circ$, find measure of $\angle ADB$.



- (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 $\cos \theta$ using trigonometric identity.

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

- (1) In the following figure, $XY \parallel \text{seg } AC$. If $2AX = 3BX$ and $XY \parallel AC$. Complete the activity to find the value of AC .



Activity :

$$2AX = 3BX \text{ (Given)}$$

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

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

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

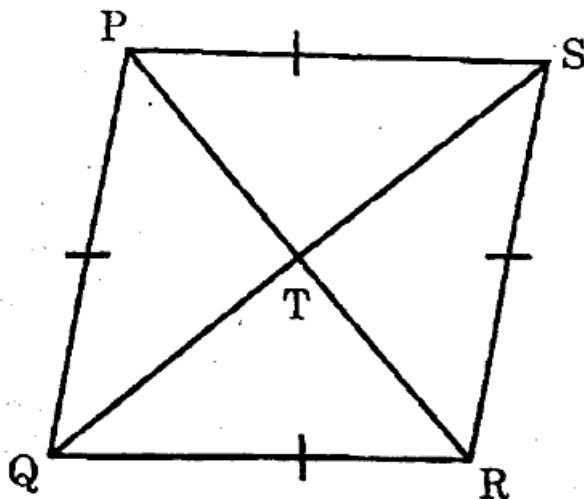
Now $\triangle BCA \sim \triangle BYX \dots\dots\dots$ ($\boxed{}$ test of similarity)

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

$$\frac{\boxed{\frac{5}{2}}}{\boxed{2}} = \frac{AC}{9} \dots\dots\dots \text{from (I)}$$

$$\therefore AC = \boxed{22.5}$$

- (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 :

□ 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,

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

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

adding (I) and (II),

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

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

$$\dots\dots\dots (RT = PT)$$

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

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

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

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

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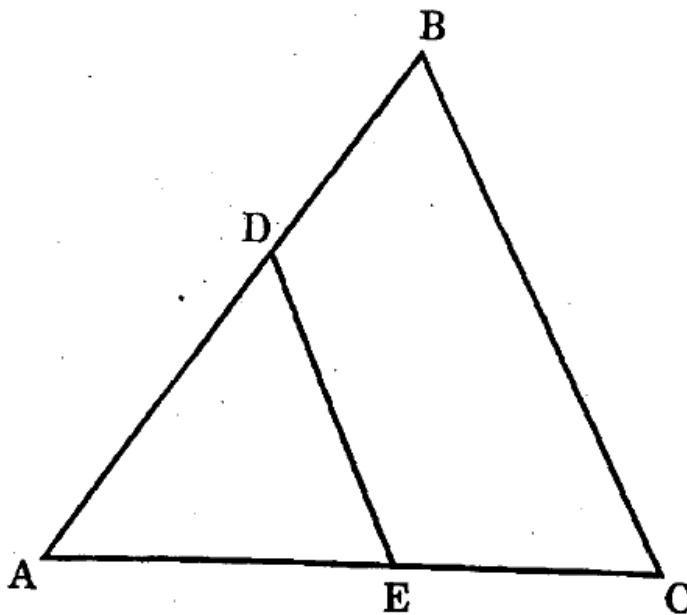
- (1) Show that points $P(1, -2)$, $Q(5, 2)$, $R(3, -1)$, $S(-1, -5)$ are the vertices of a parallelogram.
- (2) Prove that tangent segments drawn from an external point to a circle are congruent.
- (3) Draw a circle with radius 4.1 cm. Construct tangents to the circle from a point at a distance 7.3 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 ?

Solve the following sub-questions (any two) :

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

- (i) If $DE = 4$ cm, $BC = 8$ cm, $A(\triangle ADE) = 25$ cm², find $A(\triangle ABC)$.
- (ii) If $DE : BC = 3 : 5$, then find $A(\triangle ADE) : A(\square DBCE)$.



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

- (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 : ($\pi = 3.14$)

- (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) :

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- (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 $\theta = 30^\circ$ to verify the following Trigonometric identities :

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

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

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