N 632

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.

P.T.O.

1. **(A)** **Four alternative answers for each of the following sub-questions are given. Choose the correct 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) $\dfrac{1}{2}$

        (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

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

(1)   If $\triangle ABC \sim \triangle PQR$ and AB : PQ = 2 : 3, then find the value

of $\dfrac{A(\triangle ABC)}{A(\triangle PQR)}$.

(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
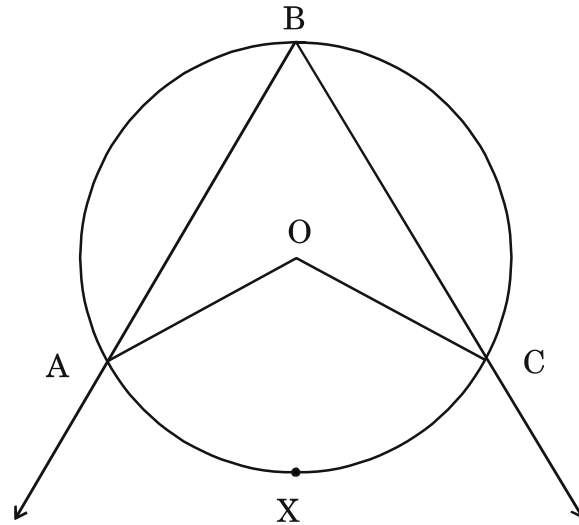
45º. Find the slope of that line.

P.T.O.

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

(1)

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

If ∠ABC = 60º, find m ∠AOC.

Solution :

∠ABC = $\dfrac{1}{2}$ m(arc AXC)   .... $\boxed{}$

  60º = $\dfrac{1}{2}$ m(arc AXC)

$\boxed{}$ = m(arc AXC)

  But m∠AOC = $\boxed{m(\text{arc} .....)}$ .... (Property of central angle)

  ∴ m∠AOC = $\boxed{}$

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

A

B   C

θº
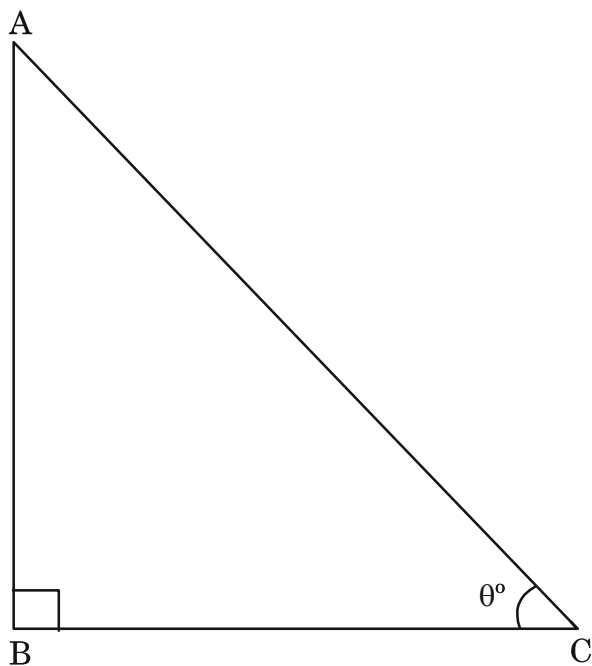
Solution :

In $\triangle$ ABC, $\angle$ABC = 90º, $\angle$C = θº.

$AB^2 + BC^2 =$ ⬜ .... (Pythagoras theorem)

Divide both sides by AC^2

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

∴ $\left(\dfrac{AB}{AC}\right)^2 + \left(\dfrac{BC}{AC}\right)^2 = 1$
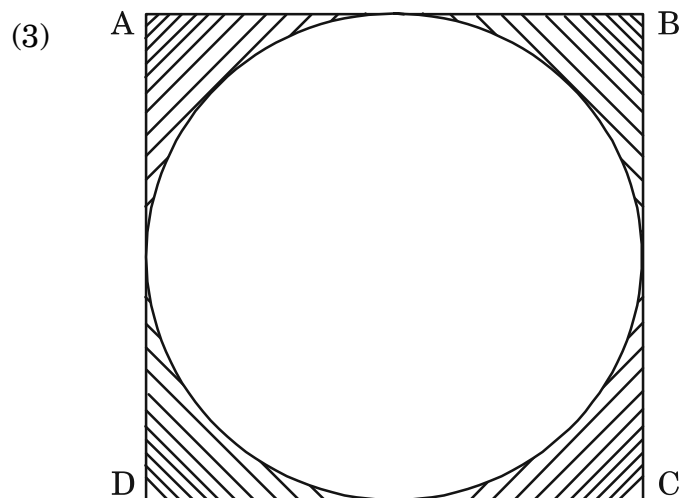
But $\dfrac{AB}{AC} =$ ⬜ and $\dfrac{BC}{AC} =$ ⬜

∴ $\sin^2\theta + \cos^2\theta =$ ⬜

P.T.O.

(3)

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

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

Solution :

$$\text{Area of square} = \left(\boxed{}\right)^2 \quad \text{............... (Formula)}$$

$$= 14^2$$

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

$$\text{Area of circle} = \boxed{} \quad \text{............... (Formula)}$$

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

$$= 154 \text{ cm}^2$$

$$\left(\begin{array}{c}\text{Area of} \\ \text{shaded portion}\end{array}\right) = \left(\begin{array}{c}\text{Area of} \\ \text{square}\end{array}\right) - \left(\begin{array}{c}\text{Area of} \\ \text{circle}\end{array}\right)$$

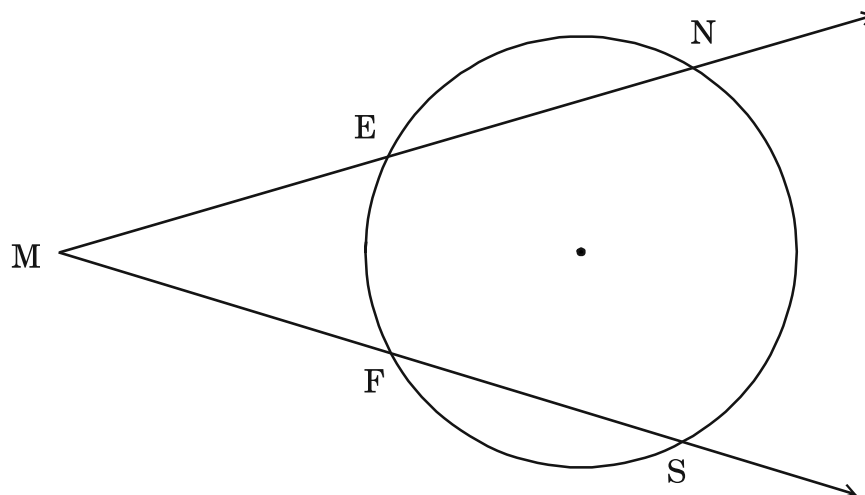$$= 196 - 154$$

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

(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, $m(\text{arc NS}) = 125°$, $m(\text{arc EF}) = 37°$.

Find the measure of $\angle$NMS.

    (4) Find the slope of the line passing through the points A(2, 3), B(4, 7).
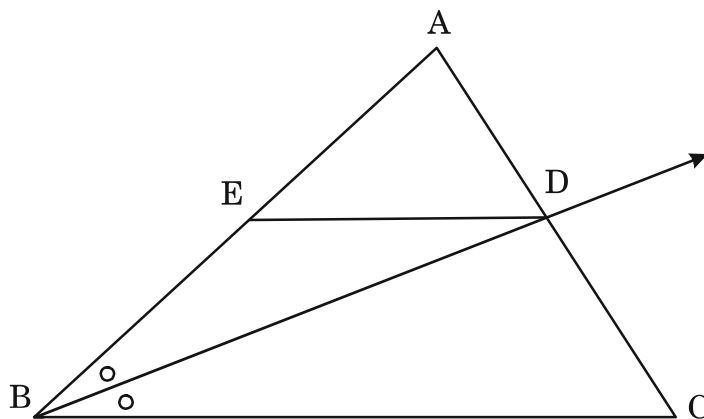
    (5) Find the surface area of a sphere of radius 7 cm.

P.T.O.

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

(1)

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

Proof :

In $\triangle$ ABC, ray BD bisects $\angle$B

$\therefore \quad \dfrac{\boxed{}}{BC} = \dfrac{AD}{DC}$ .... (I) $\left(\boxed{} \right)$

In $\triangle$ ABC, DE $\parallel$ BC

$\therefore \quad \dfrac{\boxed{}}{EB} = \dfrac{AD}{DC}$ .... (II) $\left(\boxed{} \right)$

$\dfrac{AB}{\boxed{}} = \dfrac{\boxed{}}{EB}$ .... [from (I) and (II)]

(2)
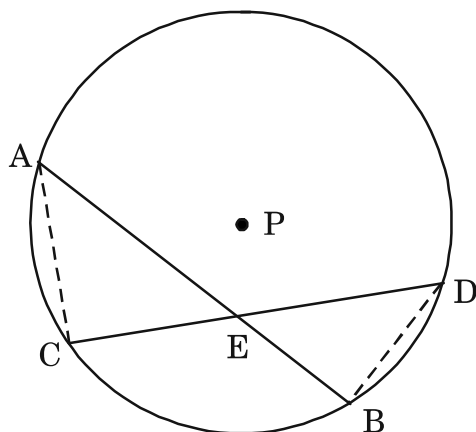
Given :

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

To prove :

$$AE \times EB = CE \times ED$$

Construction :

Draw seg AC and seg BD.

Fill in the blanks and complete the proof.

Proof :

In $\triangle$ CAE and $\triangle$ BDE

∠AEC $\cong$ ∠DEB .... ☐

☐ $\cong$ ∠BDE (angles inscribed in the same arc)

∴ $\triangle$ CAE ~ $\triangle$ BDE .... ☐

∴ $\dfrac{\boxed{}}{DE} = \dfrac{CE}{\boxed{}}$ .... ☐

∴ $AE \times EB = CE \times ED$.

P.T.O.

(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) $\triangle ABC \sim \triangle LMN$. In $\triangle ABC$, AB = 5.5 cm, BC = 6 cm, CA = 4.5 cm. Construct $\triangle ABC$ and $\triangle LMN$ such that $\dfrac{BC}{MN} = \dfrac{5}{4}$.

    (3)   Seg PM is a median of $\triangle PQR$, 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'.

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

    (1) $\dfrac{1}{\sin^2 \theta} - \dfrac{1}{\cos^2 \theta} - \dfrac{1}{\tan^2 \theta} - \dfrac{1}{\cot^2 \theta} - \dfrac{1}{\sec^2 \theta} - \dfrac{1}{\csc^2 \theta} = -3$, 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 $\angle APB = 70^\circ$.

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.