

N 632

Seat No.

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2024 III 15 1100 – N 632 – MATHEMATICS / (71) GEOMETRY—PART II (E)

(REVISED COURSE)

Time : 2 Hours

(Pages 11)

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.

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 :

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(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

(B) Solve the following sub-questions :

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(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.

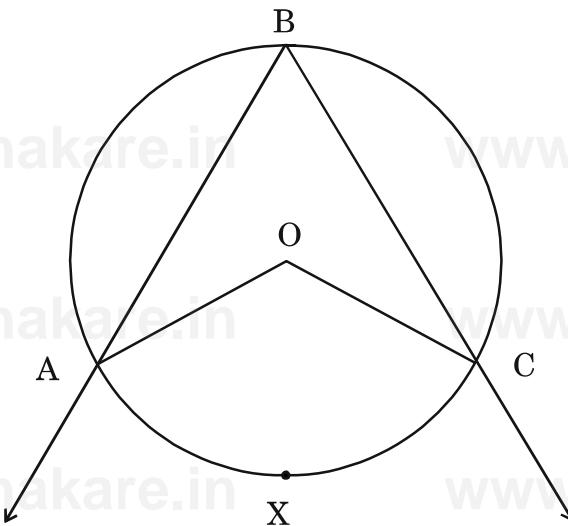
P.T.O.

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

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(1)

In the above figure, $\angle ABC$ is inscribed in arc ABC .If $\angle ABC = 60^\circ$, find $m\angle AOC$.**Solution :**

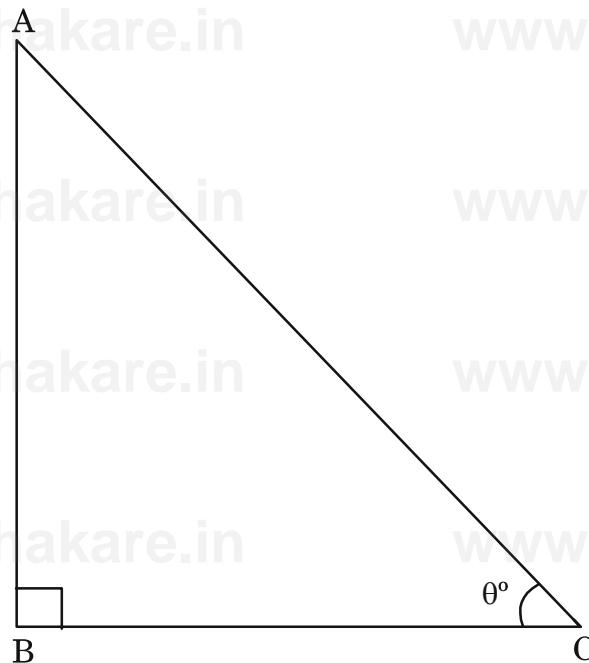
$$\angle ABC = \frac{1}{2} m(\text{arc } AXC) \dots \boxed{\quad}$$

$$60^\circ = \frac{1}{2} m(\text{arc } AXC)$$

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

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

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

5/N 632(2) Find the value of $\sin^2 \theta + \cos^2 \theta$.**Solution :**In $\triangle ABC$, $\angle ABC = 90^\circ$, $\angle C = \theta^\circ$.

$$AB^2 + BC^2 = \boxed{} \dots \text{(Pythagoras theorem)}$$

Divide both sides by AC^2

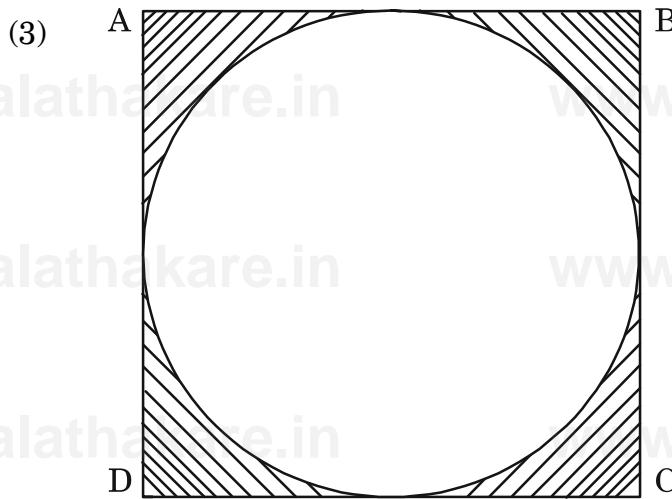
$$\frac{AB^2}{AC^2} + \frac{BC^2}{AC^2} = \frac{AC^2}{AC^2}$$

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

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

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

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In the figure given above, \square 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 :

$$\text{Area of square} = (\boxed{\square})^2 \dots \text{(Formula)}$$

$$= 14^2$$

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

$$\text{Area of circle} = \boxed{\square} \dots \text{(Formula)}$$

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

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

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

$$= 196 - 154$$

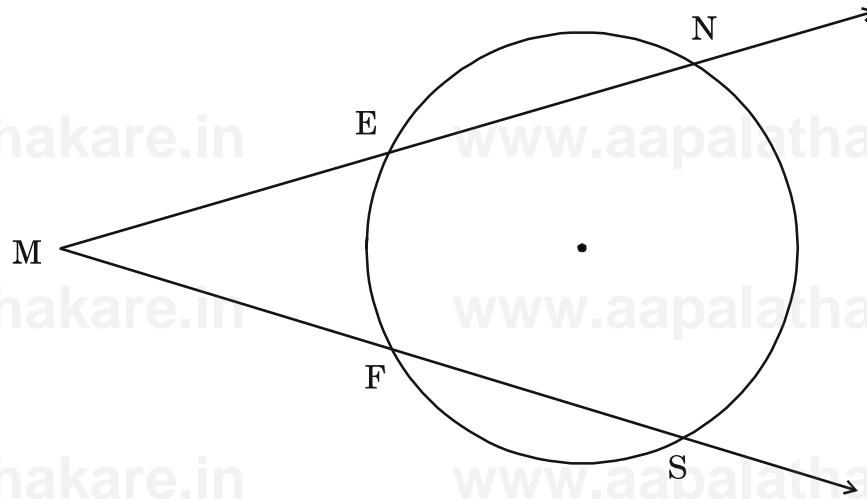
$$= \boxed{\square} \text{ cm}^2$$

7/N 632**(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, $m(\text{arc NS}) = 125^\circ$, $m(\text{arc EF}) = 37^\circ$.

Find the measure of $\angle NMS$.

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

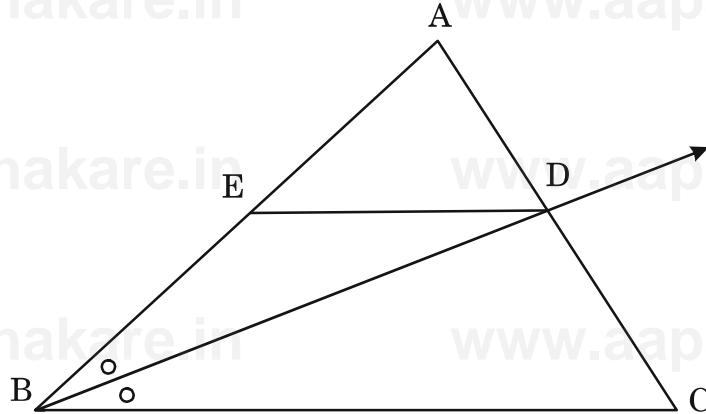
(5) Find the surface area of a sphere of radius 7 cm.

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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 $\frac{AB}{BC} = \frac{AE}{EB}$, complete the following

activity :

Proof :

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

$$\therefore \frac{\boxed{}}{BC} = \frac{AD}{DC} \dots \text{(I)} \left(\boxed{} \right)$$

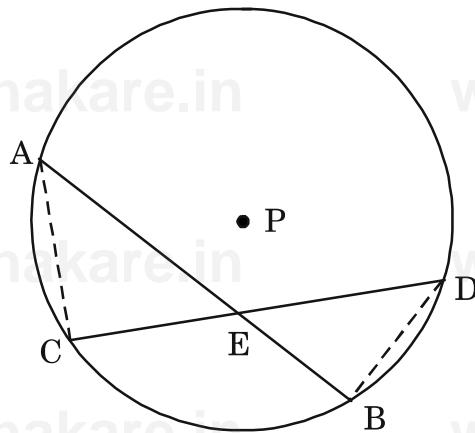
In $\triangle ABC$, $DE \parallel BC$

$$\therefore \frac{\boxed{}}{EB} = \frac{AD}{DC} \dots \text{(II)} \left(\boxed{} \right)$$

$$\frac{AB}{\boxed{}} = \frac{\boxed{}}{EB} \dots \text{[from (I) and (II)]}$$

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(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 $\triangle BDE$

$$\angle AEC \cong \angle DEB \dots \boxed{\quad}$$

$$\boxed{\quad} \cong \angle BDE \text{ (angles inscribed in the same arc)}$$

$$\therefore \triangle CAE \sim \triangle BDE \dots \boxed{\quad}$$

$$\therefore \frac{\boxed{\quad}}{DE} = \frac{CE}{\boxed{\quad}} \dots \boxed{\quad}$$

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

P.T.O.

10/N 632**(B) Solve any two of the following sub-questions :**

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(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'.

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

8

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

5. Solve any one of the following sub-questions :

3

(1) ABCD is trapezium, $AB \parallel CD$ 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 $\angle CAT$ and $\angle ABC$ with reasons.

(c) Whether $\angle CAT$ and $\angle ABC$ are congruent ? Justify your answer.