मंगलाबाई भागवत फाऊंडेशन

Mathematics - Part II
Std : X

Time : 2 Hrs **Marks : 80**

Notes :

1) All questions are compulsory
2) Use of calculator is not allowed
3) Figures to the right of the questions indicate full marks
4) Draw proper figures for answers wherever necessary.
5) The marks of construction should be clear and distinct. Do not erase them.
6) While writing any proof, drawing relevant figure is necessary. Also the proof should be consistent with these figures.

Q.1. A) Choose the correct alternative. **(4)**

1) What is the ratio of area of two triangles with common base and equal height?

(a) 1:2 (b) 1:1 (c) 2:1 (d) none of these

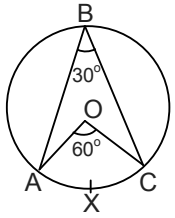
2) The lengths of perpendicular sides in a right-angled triangle are 8cm and 15cm. Find the length of hypotenuse ?

(a) 16 (b) 27 (c) 17 (d) 13

3) In the given figures, O is the centre of the circle. Find *m*(arc AXC).

a) 30^o b) 60^o

c) 90^o d) 120^o

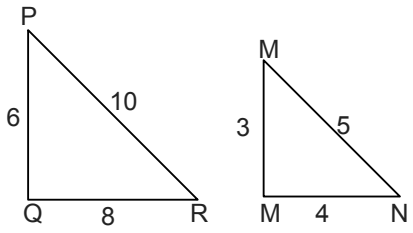


4) $\sin 60^o$ = ?

a) 0 b) $\frac{1}{2}$ c) $\frac{1}{\sqrt{2}}$ d) $\cos 30^o$

Q.1. B) Solve the following questions. **(4)**

1) Are the triangles in the given figure similar ? If yes, by which test ?



2) Two circles having radii 3.5cm and 4.8cm touch each other internally. Find distance between their centres.

3) Draw perpendicular bisector of hypotenuse in a right-angled triangle.

4) If $\sin\theta = \frac{7}{25}$ then find $\cos\theta$.

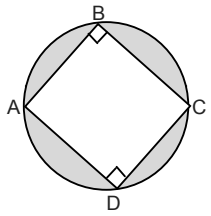
... 2.

Q.2. A) Complete the following activities. (Any two) **(4)**

1) AC is diameter of the circle. Prove that the total measure of a circle is 360^o.

Given : AC is diameter of the circle.

To prove : m(arc ABC) + m(arc ADC) = 360^o.



Proof : $\angle ABC = \frac{1}{2} m(\text{arc ADC})$ ... [ ]

$\therefore m(\text{arc ADC}) =$ [ ] ... (i)

$\angle ABC = \frac{1}{2} m(\text{arc ABC})$ ... [ ]

$\therefore m(\text{arc ADC}) =$ [ ] ...(ii)

$\therefore m(\text{arc ADC}) + \therefore m(\text{arc ABC}) = 360^o$ ... [From (i) and (ii)]

2) How many cubes of length 2cm. can be made from a cuboids of 4cm. x 10 cm. x 20cm.

Number of cubes = $\frac{\text{Volume of the cuboid}}{\text{[ ]}}$

$= \frac{\text{[ ]}}{\ell^3}$

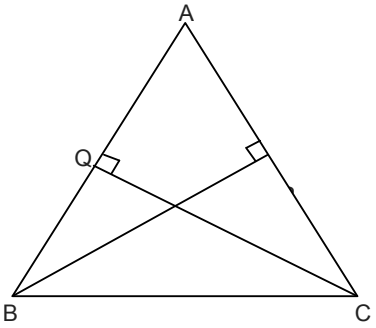
$= \frac{\text{[ ]}}{2^3}$

= [ ]

3) In the adjoining figure, BP $\perp$ AC, CQ $\perp$ AB, A – P – C, A – Q – B,

Then prove that ΔAPB AND ΔAQC are similar.

Proof :



In ΔAPB AND ΔAQC

$\angle$ APB = [ ] ... (i)

$\angle$AQC = [ ] ... (ii)

$\therefore \angle$ APB = $\angle$ AQC ... [From (i) and (ii)]

$\angle$ PAB = $\angle$ QAC ... [ ]

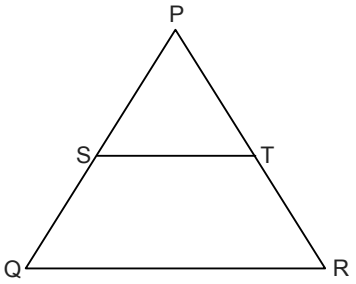
$\therefore \Delta$ APB = Δ AQC ... [ ]

... 3.

Q.2. B) Complete the following activities. (Any two) **(8)**

1) In Δ PQR, ST || QR, ℓ(PS) = 2.5,

ℓ(SQ) = 5. Find = $\frac{PT}{TR}$



2) In Δ ABC, G(− 4, −7) is the centroid. If A(−14, −19) and B(3,5) then find the co-ordinates of C.

3) If sinθ = $\frac{3}{4}$, then find cosθ and tanθ.

4) Construct a tangent at any point on the circle of radius 3.3cm. without using centre.

5) The surface area of a sphere is 616 cm^2, find the radius of the sphere.

Q.3. A) Complete the following activity. (Any one) **(3)**

1) Complete the following activity to find the value of $\boldsymbol{h}$ and $\boldsymbol{k}$.

A (*h, -6), B (2,3) and C (-6, k)* are the co-ordinates of vertices of a triangle whose Centroid is G (1,5)

Write the values of $x_1, y_1, x_2, y_2, x_3, y_3$, *x,y*

Centroid formula for x-coordinate = | |

∴ 1 = $\frac{h + 2+(-6)}{3}$

∴ h = | |

Centroid formula for y-coordinate = | |

∴ 1 = $\frac{-6 + 3 + k)}{3}$ = | |

∴ k = | |

2) In the figure, square ABCD is inscribed in the sector A-PCQ. The radius of Sector C-BXD is 20 cm. Complete the following activity to find the area of shaded region.

Solution :

Area of square ABCD = ☐

Area of shaded region inside the square

= Area of square ABCD – Area of

= ☐ – ☐

= ☐

Area of the shaded region = ☐

B) Solve the following questions. (Any two) **(6)**

1) Prove that the perpendicular segment to the hypotenuse from the opposite vertex is the geometric mean of the segments into which the hypotenuse is divided.
2) In the given figure, ℓ is tangent to the circle at point A. m(arc BXC) = 200^{o} and m(arc AB) = m(arc AC),

   then find ∠BAC, ∠ABC and ∠ACB.
3) Draw a circle with radius 3.1 cm. Construct tangents to the circle from a point at a Distance of 7.2 cm. from the centre.
4) Prove that $\cos^2\theta\,(1 + \tan^2\theta) = 1$

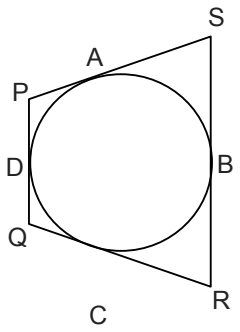
Q.4 B) Solve the following questions. (Any two) **(8)**

1) A circle is inscribed

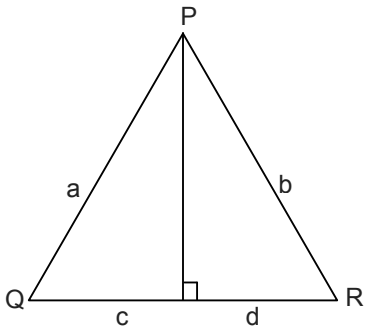
   In the ☐PQRS.

   Prove that:

   QR + SP = QP + SR



2) In ΔPQR, PQ = a, PR = b, QD = c, DR = d
And PD $\perp$ QR
Prove that (a + b) (a – b) = (c + d) (c – d)



3) Prove that when two triangles are similar, the ratio of areas of those triangles is equal to the ratio of the squares of their corresponding sides.

Q.5 Solve the following questions. (Any One) **(3)**

1) In which quadrant the point P that divides the line segment joining the points A(2, -5) and B(5,2) in the ratio 2:3 lies ?

2) A cylindrical container of radius 42cm. and height 90 cm. is filled with ice-cream Up to 80% of its capacity. How many cones can we fill with ice-cream of radius 7cm. and height 10cm. ?

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