PVG's

Muktangan English School & Jr. College, Pune - 9

Preliminary Examination (2024-25)

STD X

Subject : Mathematics (Part II) Marks - 40

Date : 6.01.2025 Time : - 8.15 - 10.15 am

Q1. A) Attempt the following by choosing the correct alternatives given and write the correct alternative alphabet [e.g 1-(A)]. (4)

1. $\Delta ABC \sim \Delta PQR$, then $\frac{AB}{PQ} = \frac{\square}{PR}$

   A) PQ B) AC C) AB D) BC

2. Out of the given triplet, which is not a Pythagorean triplet.

   A) (61, 60, 11) B) (25, 24, 7) C) (15, 14, 5) D) (5, 4, 3)

3. Seg. AB is parallel to Y - axis and co-ordinates of point A is (5, 3) then co-ordinates of point B can be _____ .

   A) (3, 5) B) (5, -3) C) (-3, -5) D) (-5, 3)

4. Two circles intersect each other such that each circle passes through the centre of the other. If the distance between their centres is 12 cm, what is the radius of each circle.

   A) 6 cm B) 12 cm C) 24 cm D) -12 cm

B) Attempt the following subquestions. (4)

1. Angle made by the line with the positive direction of X - axis is 60^0. Find the slope of that line.

2. Find the volume of the cube whose side is 0.1 cm.

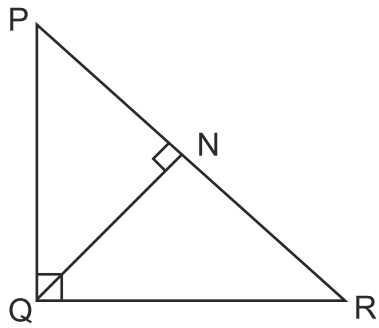
3. Two circles with radius 5 cm & 3 cm touch each other internally. What is distance between their centres?

4. In ΔABC, if $\angle B = 90^0$, $\angle A = 30^0$ and l(AC) = 8 cm. Find the length of BC.

Q2. A) Solve the following activities (any two). (4)

1. In the adjoining figure Δ PQR is a right angled triangle, seg QN $\perp$ seg PR.

   PN = 9, NR = 16. Find QN



   Solution : In Δ PQR, QN $\perp$ Seg PR

   $\therefore$ NQ = $\sqrt{\quad\quad}$ .... Reason :

   = $\sqrt{9 \times \quad}$

   $\therefore$ NQ =

2. Find the slope of a line AB such that A(2, 1), B (6, 7).

   Solution : Here, $x_1 = 2$, $x_2 = 6$, $y_1 = 1$, $y_2 = 7$

   Slope of a line AB = ... Formula

   =

   =

   After reducing to the lowest form.

   $\therefore$ Slope of a line AB =

3. $\square$ MRPN is cyclic quadrilateral. If m $\angle$ R = 92^0, find the measure of $\angle$ N.

   Solution : $\square$ MRPN is a cyclic quadrilateral

   $\therefore$ By theorem of

   $\angle R + \angle N$ =

   $\therefore 92^0 + \angle N$ =

   on solving

   $\angle N$ =

B) Attempt any four of the following subquestions. (8)

1. If $5 \sin\theta - 12 \cos\theta = 0$. Find the value of $\cot\theta$ and $\tan\theta$.

2. Draw a circle with centre O and radius 3.5 cm. Take a point A on it and construct a tangent at A without using the centre of the circle.

3. Find the length of an arc if the measure of the arc is 80^0 & its radius is 18 cm.

4. Find the distance between the points P (-1, 1) and Q (5, -7) by using distance formula.

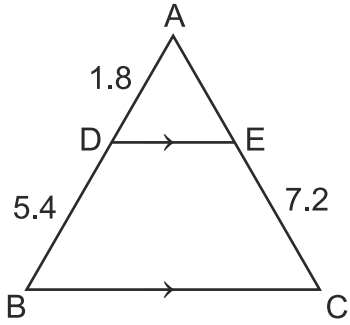
5. In the adjoining figure,

   Δ ABC is the given triangle

   in which DE $\|$ BC, If

   AD = 1.8, DB = 5.4 and

   EC = 7.2. Find the value of AE.



Q3. A) Attempt the following activity (any one) **(3)**

1. In the adjoining figure,

   seg. AB is a diameter of a circle with

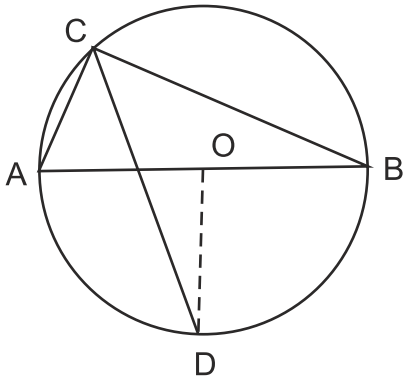
   centre O. The bisectors of $\angle$ ACB

   intersect the circle at point D.

   Prove that seg AD $\cong$ seg BD.

   Complete the following proof

   by filling in the blanks.



Proof : Draw seg OD.

$\angle$ ACB = [ ] —— (Angle inscribed in a semicircle.)

$\angle$ DCB = [ ] —— (CD is bisector of $\angle$ ACB)

m(arc DB) = [ ] —— (Inscribed angle theorem.)

$\therefore \angle$ DOB = [ ] Defination of measure od an arc —— (I)

seg OA $\cong$ Seg OB ..... [ ] —— (II)

$\therefore$ line OD is [ ] of seg AB [from I + II]

$\therefore$ seg. AD $\cong$ seg. BD

2. Are the two triangles in the adjoining figure similar?

If yes, by which test.

Solution : In Δ PMN & Δ UVW

$$\frac{PM}{\square} = \frac{6}{\square} = \frac{\square}{1} \quad \text{—— (I)}$$

$$\frac{MN}{VW} = \frac{\square}{\square} = \frac{\square}{1} \quad \text{—— (II)}$$

$\therefore$ From (I) & (II)

$$\frac{PM}{UV} = \frac{MN}{VW}$$

and $\angle M \cong \angle V$ .... (Given)

$\therefore \Delta PMN \sim \Delta UVW$ ..... By [ ] test

B) Attempt the following subquestions (any two). (6)

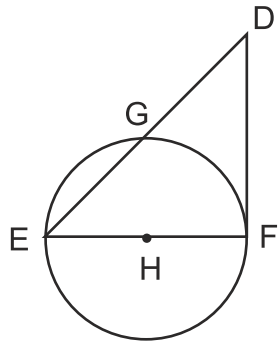
1. Show that : $\sec\theta + \tan\theta = \sqrt{\frac{1 + \sin\theta}{1 - \sin\theta}}$

2. Find K if PQ $||$ RS and P(2,4), Q(3, 6), R(3, 1) and S(5, K).

3. Prove that : In a right angled triangle the square of the hypotenuse is equal to the sum of squares of the remaining two sides.

4. In the adjoining figure, EF is a diameter and seg. DF is a tangent segment. The radius of circle is 'r'.

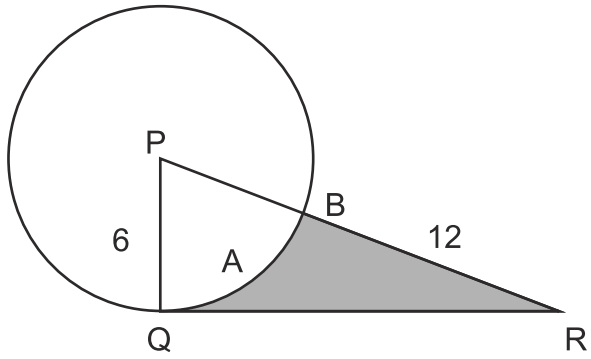
Prove that : DE x GE = $4r^2$.



Q.4 Attempt the following subquestions (any 2). **(8)**

1. $\triangle ABC \sim \triangle PQR$. In $\triangle ABC$, AB = 5.4 cm, BC = 4.2 cm and AC = 6 cm. $\frac{AB}{PQ} = \frac{3}{2}$ Construct $\triangle ABC$ & $\triangle PQR$.

2. In the adjoining figure, P is the centre of the circle with radius 6cm. Seg. QR is the tangent at Q. If PR = 12. Find the area of the shaded region. ($\sqrt{3} = 1.73$)



3. To find the width of the river, a man observes the top of the tower on the opposite bank making an angle of elevation of 61^0. When he moves 50 m backward from the bank and observes the top of the tower, his line vision makes an angle elevation of 35^0. Find the height of the tower and width of the river ($\tan 61^0 = 1.8$, $\tan 35^0 = 0.7$).

Q5. Attempt any one of the following subquestions. **(3)**

1. Give one pair of x & y such that P(x, y) is equidistant from the points A (-1, 8) and B(3, 4).

2. Draw any circle with centre R and draw a chord PQ such that m(arc PQ) = 110^0.

   If point S is on the major arc, join PS and QS.

   1) Find m $\angle$ PSQ.

   2) Find the relation between $\angle$ PRQ and $\angle$ PSQ.

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