SHIKSHA CLASSES

Subject : Geometry **Marks : 40**

Class : X **Prelim Question Paper** **Time : 2 Hr.**

Q. 1 A. Choose the correct alternatives. **4**

1) Out of the following, point ..... lies to the right of the origin on X- axis.

a) (–2, 0) b) (0, 2)

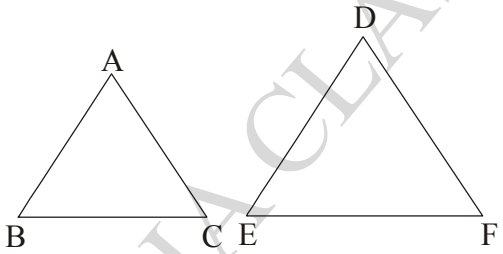
c) (2, 3) d) (2, 0)

2) If two circles are touching externally, how many common tangents of them can be drawn?

a) One b) Two

c) Three d) Four

3) $\triangle ABC$ and $\triangle DEF$ are equilateral triangles, $A(\triangle ABC) : A(\triangle DEF) = 1 : 2$ If AB = 4 then what is the length of DE ?



a) $2\sqrt{2}$ b) 4

c) 8 d) $4\sqrt{2}$

4) Cosec 45^0 x cos 45^0 =

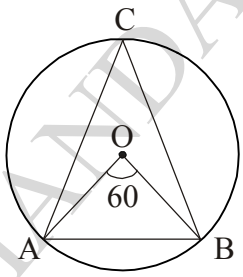
a) 2 b) 1

c) 0 d) ∞

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

1) Find the measure of

i) arc AB and ii) arc ACB.



2) Find the centroids of the triangles whose vertices are given below.

(–7, 6,), (2, –2), (8, 5).

3) Base of a triangle is 9 and height is 5. Base of another triangle is 10 and height is 6. Find the ratio of areas of these triangles.

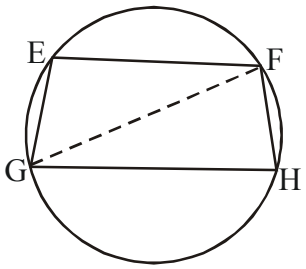
4) Prove that $\frac{\sin^2\theta}{\cos\theta} + \cos\theta = \sec\theta$.

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

1) In the figure, chord EF || Chord GH.

Prove that

Chord EG ≅ Chord FH



Fill in the blanks and write the proof.

Proof : Draw seg GF.

$\angle EFG = \angle FGH =$ ..... (Alternate

Angles) ..... (i)

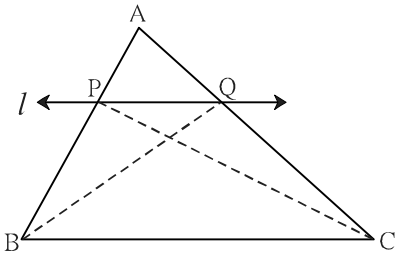
$\angle$ EFG = [ ] .....
(Inscribed angle theorem) ..... (ii)

$\angle$ FGH = [ ] .....
(Inscribed angle theorem) ..... (iii)

m (arc EG) = m ([ ]) ..... [From (1), (2), (3)]

$\therefore$ Chord EG $\cong$ Chord FH .....
(.....)

2) If a line parallel to a side of a triangle intersects the remaining sides in two distinct points, then the line divides the sides in the same proportion. Then prove that $\frac{AP}{PB} = \frac{AQ}{QC}$



Given :

In $\triangle ABC$ line $l \parallel$ line BC

line l intersects AB and AC in points P and Q respectively

To prove $= \frac{AP}{PB} = \frac{AQ}{QC}$

Construction :

draw seg PC and seg BQ

Proof - $\triangle APQ$ and $\triangle PQB$ have equal heights

$\therefore \frac{A(\triangle APQ)}{A(\triangle PQB)} = \frac{AP}{[\ ]}$ ---(i)

(areas proportionate to bases)

Similary

$\frac{A(\triangle APQ)}{[\ ]} = \frac{AQ}{QC}$ ---(ii)

(areas proportionate to bases)

seg PQ is common base of $\triangle PQB$ and $\triangle PQC$ seg PQ $\parallel$ seg BC hence $\triangle PQB$ and $\triangle PQC$ have equal heights.

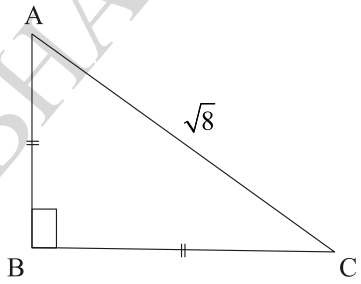
$\triangle PQB =$ [ ] ---(iii)

$\frac{A(\triangle APQ)}{A(\triangle PQB)} = \frac{A(\triangle APQ)}{[\ ]}$ --- from (i), (ii) and (iii)

$\therefore \frac{AP}{PB} = \frac{AQ}{QC}$

3) To find AB and BC with the help of information given in figure complete the following activity

AB = BC ..... (Side opposite to congruent angle)



$\angle BAC = 45^0$

$\therefore AB = BC = [\ ] \times AC$

$= [\ ] \times \sqrt{8}$

$= [\ ] \times 2\sqrt{2}$

$= [\ ]$

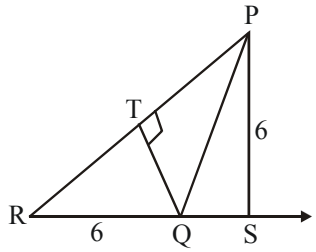
B. Solve any Four of the following questions : **(8)**

1) Draw any circle. Take any point A on it and construct tangents at A without using the centre of the circle.

2) Find the distance between the points P(–6, –3), Q (–1, 9).

3) If $\cot\theta = \frac{40}{9}$ find the value of cosec θ and sinθ.

4) In following figure, Seg RQ, Seg QT ⊥ seg PR. If RQ = 6, PS = 6 and PR = 12, Then find QT.



5) Prove that, any rectangle is a cyclic quadrilateral.

Q. 3 A. Complete the following activities.

(Any ONE) **(3)**

1) $\cos\theta = \frac{\sqrt{3}}{2}$ **then find the value of**

$\frac{1-\sec\theta}{1+\text{cosec}\,\theta}$.

$\cos\theta = \frac{\sqrt{3}}{2}$

$\therefore \quad \sec\theta = \frac{\square}{\square}$

$\sin^2\theta + \square = 1$

$\sin^2\theta + \left(\frac{\sqrt{3}}{2}\right)^2 = 1$

$\sin^2\theta = 1 - \frac{\square}{\square} = \frac{\square}{\square}$

$\sin\theta = \frac{1}{2} \qquad \therefore \ \text{cosec}\,\theta = 2$

$= \frac{1-\sec\theta}{1+\text{cosec}\,\theta} = \frac{1-\frac{2}{\sqrt{3}}}{1+2}$

$= \frac{\frac{\square}{\square} - 2}{\sqrt{3}}$

$= \frac{\sqrt{3}-2}{3}$

$= \frac{\sqrt{3}-2}{3\sqrt{3}}$.

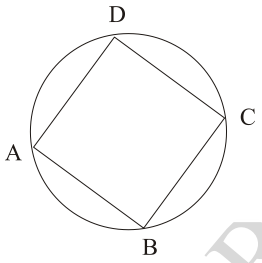
2) Opposite angles of a cyclic quadrilateral are supplementary. To prove it complete the following activity.

Given : ☐ is cyclic

To prove :

$\angle B + \angle D = \square$

$\square + \angle C = 180^0$



Proof : Arc ABC is intercepted by the inscribed angle ∠ADC

$\therefore \angle ADC = \frac{1}{2}\square$ ..... (I)

similarly ☐ is an incribed angle

It intercepts arc ADC

$\therefore \square = \frac{1}{2}$ m(are ADC) .....(II)

$\therefore$ m∠ADC + ☐ $= \frac{1}{2}\square +$

$\frac{1}{2}$ m(arc ADC) from (I) & (II)

$= \frac{1}{2}[\square + \text{m(arc ADC)}]$

$= \frac{1}{2} \times 360^0$ ..... arc ABC and arc ADC constitute a complete circle

$= \square$

similarly we can prove $\angle A + \angle C$

$= \square$

Q. 3 B) Solve the following questions :

(Any TWO) **6**

1) Find the type of the quadrilateral, if point A(-4, -2), B (-3,-7), C (3,-2) and D (2,3) are joined serially.

2) Prove the following

$\sec\theta(1-\sin\theta)\ \ (\sec\theta+\tan\theta)=1.$

3) $\triangle AMT \sim \triangle AHE.$ In $\triangle AMT$,

$AM = 6.3\,cm$

$\angle TAM = 50^0$, $AT = 5.6\,cm$ $\frac{AM}{AH}=\frac{7}{5}$

construct $\triangle AHE$

4) Prove that in a right angled triangle the square of the hyotenuse is equal to the sum of th squares of remaining two sides.

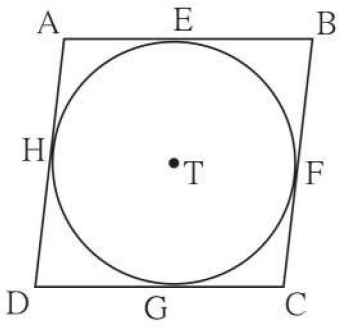
Q. 4 Solve the following questions :

(Any TWO) **8**

1) Prove that the points P(0, – 4), Q (6, 2) R (3, 5) and S (–3, –1) are the vertices of a rectangle.

2) Hypotenuse of a right triangle is 25cm and out of the remaining two sides, one is longer than the other by 5 cm find the lengths of the other two sides.

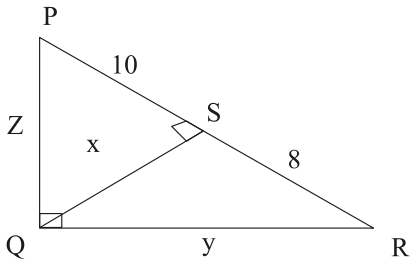
3) In figure, $\square ABCD$ is a parallelogram. It circumscribes the circle with cnetre T. Point E, F, G, H are touching points. If AE = 4.5, EB = 5.5, find AD.



Q. 5 Solve any ONE of the following quetions : **3**

1) If $5\sin\theta - 12\cos\theta = 0$ find the value of $\sec\theta$ and $\text{cosec}\,\theta$

2) In PQR, $\angle PQR = 90^0$ seg $QS \perp$ seg PR then find x, y, z.



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