

Maharashtra State Board

Class IX Mathematics – Geometry

Board Paper 2

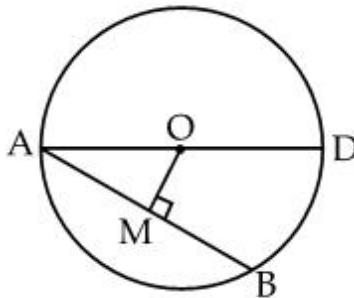
Time: 2 hours

Total Marks: 40

Note: - (1) All questions are compulsory.
 (2) Use of calculator is not allowed.

1. Attempt any five sub-questions from the following: 5

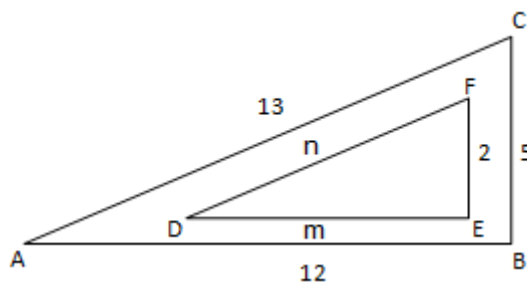
- i. Angles of a triangle are in the ratio 2 : 2 : 5. Name the type of the triangle.
- ii. If $AB = 8$ cm, $BC = 15$ cm and $CA = 19$ cm. State whether these sides form a ΔABC .
- iii. AD is a diameter of the circle shown and AB is a chord. If $AB = 24$ cm, $AD = 30$ cm, then find the distance of AB from the centre of the circle.



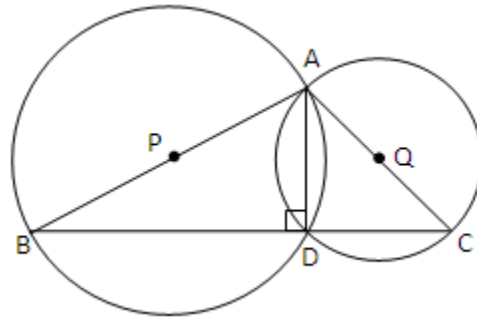
- iv. If $J \equiv (-8, -4)$, $L \equiv (1, 2)$ and point P divides seg JL externally in the ratio 1 : 2, find the co-ordinates of P .
- v. Find the value of $4\cot^2 45^\circ - \sec^2 60^\circ + \operatorname{cosec}^2 30^\circ + \cot 90^\circ$.
- vi. Find the perimeter of a semicircle whose radius is 28 cm.

2. Attempt any four sub-questions from the following: 8

- i. If measure of an angle is $(3/5)$ th of a right angle, then find the measure of its supplementary angle.
- ii. In the figure, if $\Delta CAB \sim \Delta FDE$, find the values of m and n .



- iii. In ΔABC , $\angle A = 40^\circ$, $\angle B = 80^\circ$. Find the shortest and the longest sides of ΔABC . Justify.
- iv. In the figure, sides AB and AC of ΔABC are diameters of two circles. If those two circles divide the side BC such that $BD = 3 \times DC$ and if $AD \perp BC$, then prove that $AB^2 = AC^2 + \frac{1}{2}BC^2$.

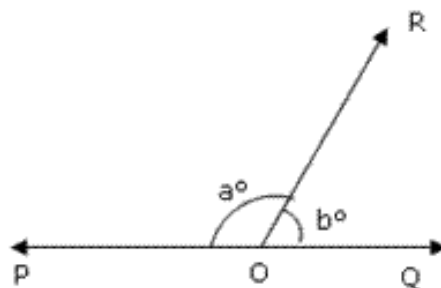


- v. The perimeter of a parallelogram is 150 cm and one of its side is greater than the other by 25 cm. Find the lengths of all the sides of that parallelogram.
- vi. Evaluate: $\frac{\tan^2 60^\circ + 4 \cos^2 45^\circ + \sec^2 30^\circ + 5 \cos^2 90^\circ}{\operatorname{cosec} 30^\circ + \sec 60^\circ - \cot^2 30^\circ}$

3. Attempt any three of the following sub-questions:

9

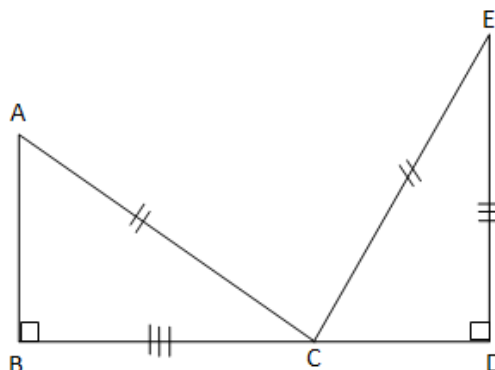
- i. In the given figure, PQ is a straight line. If $a - b = 80^\circ$, find $\angle POR$ and $\angle ROQ$.



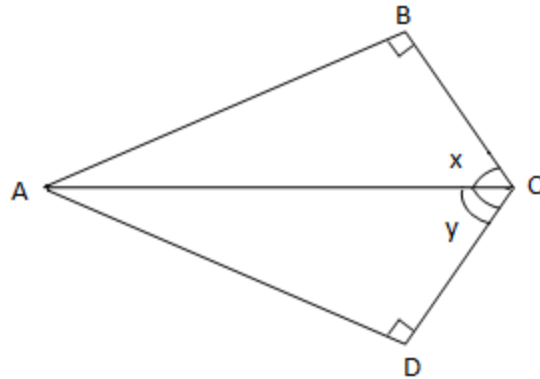
- ii. In the figure, $\angle ABC = \angle CDE = 90^\circ$. $\text{Seg } AC \cong \text{seg } CE$, $\text{seg } BC \cong \text{seg } ED$.

Show that:

- (a) $\Delta ABC \cong \Delta CDE$
 (b) $\angle BAC \cong \angle DCE$
 (c) $\angle ACE = 90^\circ$

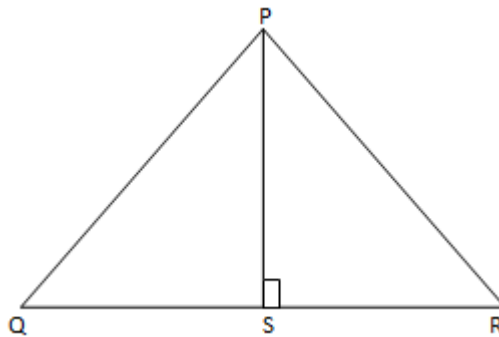


- iii. Prove that the triangle formed by joining the mid points of the sides of an isosceles triangle is an isosceles triangle.
- iv. $A(-3, 0)$ and $B(3, 0)$ are the vertices of an equilateral $\triangle ABC$. Find the coordinates of C .
- v. From the figure, write $\tan x$, $\cot(90^\circ - y)$, $\sec y$, $\sin(90^\circ - x)$, $\operatorname{cosec}(90^\circ - y)$, $\cos(90^\circ - x)$ in terms of sides.



4. Attempt any two sub-questions from the following: 8

- i. The perimeter of an isosceles triangle shown below is 42 cm and its base is 1.5 times its congruent sides. Find
 - (a) The length of congruent sides of the triangle
 - (b) The height of the triangle
 - (c) The area of the triangle



- ii. In a $\triangle PQR$, if $3\angle Q = 4\angle R = 6\angle P$, calculate the measures of $\angle Q$, $\angle R$ and $\angle P$.
- iii. Draw a line l and take any point M outside the line. Draw a line $m \parallel$ line l through the point M .

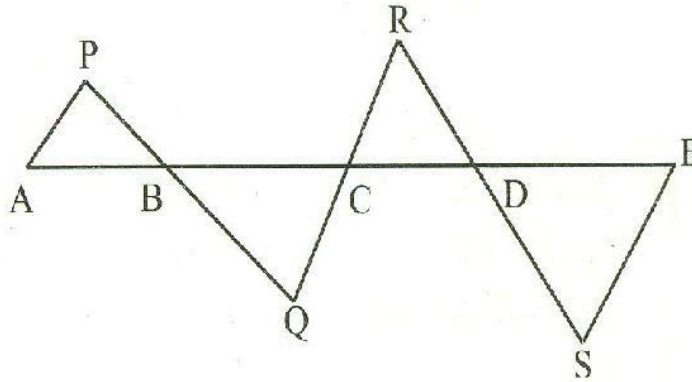
5. Attempt any two of the following sub-questions:

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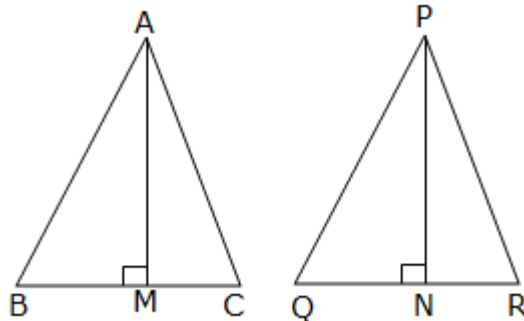
- i. In the figure $l(AC) = 8$, $l(BC) = 5$. If $\text{Seg } BD \cong \text{Seg } CE \cong \text{Seg } AC$, then determine whether the segment in each of the following pairs are congruent or not.

(a) seg BC and seg DE

(b) seg AB and seg CD



- ii. In the adjoining figure, two sides AB, AC and altitude AM of ΔABC are respectively equal to two sides PQ, PR and altitude PN of ΔPQR . Prove that $\Delta ABC \cong \Delta PQR$.



- iii. Prove that in a rhombus with an angle of 60° , the shorter diagonal divides the rhombus into two equilateral triangles.