Maharashtra State Board  
Class IX Mathematics – Geometry  
Board Paper 1

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:  

   i. An exterior angle of a triangle is 80° and two interior opposite angles are equal. Find the measure of each of these angles.

   ii. In the given figure, AB = AC and ∠ACD = 105°, find ∠BAC.

   iii. If P is the centre of the circle with radius 6.7 cm, d(P, R) = 5.7 cm, find the position of the point R with respect to the circle.

   iv. Find the distance between the points A(2, 5) and B(–6, 8).

   v. Evaluate: \( \frac{\cos 80°}{\sin 10°} + \cos 59° \times \cosec 31° \)

   vi. The side of a square- shaped field is 300 m long. Find the cost of leveling the field at the rate of Rs.1.25 per m².

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

   i. In □PQRS, side QS is the angle bisector of ∠PQR and ∠PSR. Prove that: \( \Delta PQS \cong \Delta RQS \) and \( \angle P \cong \angle R \).
ii. Find the value of ‘x’ in the following figure. XY ⊥ NZ.

![Image](image1.png)

iii. Find the measure of angle 's', if the measure of angle ‘s’ is 20 more than four times its supplement.

iv. Prove that in a circle chords which subtend congruent angles at the centre are congruent.

v. In the following figure □PQRS is a quadrilateral. The bisectors of ∠P and ∠Q meet at point A. ∠S = 30° and ∠R = 100°, find the measure of ∠PAQ.

![Image](image2.png)

vi. If ∠A = 30°, then show that \[ \sin A = \sqrt{\frac{1 - \cos 2A}{2}} \]

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

i. In the figure, l(LN) = 5, l(MN) = 7, l(ML) = 6, l(NP) = 11, l(MR) = 13, l(MQ) = 2 then find l(PL), l(NR), l(LQ).

![Image](image3.png)
ii. In figure, show that \(2(AC + BD) > (AB + BC + CD + DA)\)

\[
\begin{array}{c}
\text{D} \\
\text{O} \\
\text{A} \\
\text{B}
\end{array}
\]

iii. The diagonals of a rectangle PQRS intersect at M. If \(\angle QMR = 50^\circ\), find \(\angle MPS\).

iv. Find the co-ordinates of the points which divide the line segment joining the points \((-2, 2)\) and \((6, -6)\) in four equal parts.

v. Find the value of the following:

\[
\begin{align*}
\text{(a)} & \quad \frac{\cos 35^\circ}{\sin 55^\circ} + \frac{\sin 11^\circ}{\cos 79^\circ} - \cos 28^\circ \csc 62^\circ \\
\text{(b)} & \quad \frac{\cos 81^\circ}{\sin 9^\circ} + \frac{\cos 14^\circ}{\sin 76^\circ}
\end{align*}
\]

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

i. The base of an isosceles triangle measures 80 cm. Its area is 360 cm\(^2\). Find the perimeter of the triangle.

ii. In the following trapezium PQRS, PQ = 6 cm, SR = 12 cm, RF = 9 cm, PO = 4 cm and QR = 10 cm. Calculate

\[
\begin{align*}
\text{(a)} & \quad ER \\
\text{(b)} & \quad PF
\end{align*}
\]

iii. Draw \(\triangle ABC\), where \(AB = 6\) cm, \(BC = 4\) cm, \(AC = 7\) cm. Draw a perpendicular bisector of each side of \(\triangle ABC\). In how many points do they intersect one another?
5. Attempt any two of the following sub-questions:  

i. In the given figure, PQ \parallel LM. If \( \angle 2 = (2x + 30)^\circ \), \( \angle 4 = (x + 2y)^\circ \) and \( \angle 6 = (3y + 10)^\circ \), find the measure of \( \angle 5 \).

![Figure 1](image1)

ii. In \( \triangle ABC \), sides AB and BC are congruent.
   (a) If A-P-C, then show that BP < congruent sides.
   (b) If A-C-P, then show that BP > congruent sides.

iii. In the given figure, \( \square PQRS \) and \( \square MNRL \) are rectangles, where M is the mid-point of PR. Prove that SL = LR and LN = \( \frac{1}{2} \) SQ

![Figure 2](image2)