Properties of Geometrical Figures – Question Set

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1. Interior & Exterior Angles

Q1 Find each interior angle of a regular 15-gon.

Q2 A convex n-gon has each exterior angle $24°$. Determine n.

Q3 (a) The interior angles of a quadrilateral are $70°, 95°, 110°$ and x. Find x.

(b) One angle of a pentagon is $150°$. If the other four are equal, find each equal angle.

2. Special Quadrilaterals

Q4 In rectangle $PQRS$, $PQ = 12$ cm and diagonal $PR = 13$ cm. Find QR.

Q5 A rhombus has side 10 cm and one diagonal 12 cm. Find its area.

Q6 $ABCD$ is a kite with $AB = AD = 9$ cm and $CB = CD = 6$ cm. Find $\angle BCD$.

3. Congruence & Similarity

Q7 Explain why triangles with sides $7, 8, 9$ and $7, 9, 8$ are congruent.

Q8 Two similar triangles have corresponding sides 6 cm and 10 cm. If the smaller triangle's area is 15 cm^2, find the area of the larger.

Q9 (a) State the test used to prove right-angle congruence.

(b) Give one similarity test using side ratios.

4. Parallel Lines & Mid-Segments

Q10 In $\triangle ABC$, $DE \parallel BC$. If $AD = 4$ cm, $DB = 6$ cm, $AE = 5$ cm, find EC.

Q11 The mid-points of sides AB and AC of $\triangle ABC$ are joined. If $BC = 18$ cm, find the length of the mid-segment.

Q12 A line through the mid-point of the hypotenuse of a right triangle is drawn parallel to one leg. Prove it bisects the other leg.

5. Angle Properties in Triangles

Q13 The exterior angle at vertex C of $\triangle ABC$ is 128°. One interior opposite angle is 45°. Find the third interior angle.

Q14 In isosceles triangle PQR with $PQ = PR$ and $\angle QPR = 32^\circ$, find $\angle PQR$.

Q15 A triangle has sides $8, 15, 17$. Show it is right-angled and state the right angle.

6. Mixed Proofs & Reasoning

Q16 Prove that the diagonals of a rectangle are equal and bisect each other.

Q17 In parallelogram $WXYZ$, show that each diagonal divides the figure into two congruent triangles.

Q18 Given $\triangle ABC \sim \triangle DEF$ and $AB = 3$ cm, $DE = 4.5$ cm, $DF = 7.5$ cm, find BC.

Challenge Question

Q1 Circle with centre O has chord AB. Point C lies on the circle such that $\triangle ABC$ is isosceles with $AC = BC$. The perpendicular from O to AB meets AB at D.

a) Prove D is the midpoint of AB.

b) Show $\angle COD = 2\angle CAB$.

c) If $AB = 10$ cm and radius $OA = 7$ cm, find the length CD.