Geometry and transformations - Practice test 2

Name: _____ Date: _____

16 questions | 47 marks | 55 minutes

A second mixed paper with algebraic angles, scale reasoning, construction checks and proof.

No calculator needed.

1. A triangle has angles $(x+20)^\circ$, $(2x)^\circ$ and $(x+40)^\circ$. Find x. [3 marks]

2. An exterior angle of a triangle is 120°. One opposite interior angle is 47°. Find the other opposite interior angle. [2 marks]

3. Find an interior angle of a regular octagon. [2 marks]

4. Enlarge $P(-8, 6)$ by positive factor $\frac{1}{2}$ from the origin. [2 marks]

5. An enlargement about the origin maps $(3, 4)$ to $(9, 12)$. Find the scale factor. [2 marks]

6. Two similar triangles have perimeters 24 cm and 36 cm. A side of the smaller triangle is 7 cm. Find the corresponding larger side. [3 marks]

7. Two similar figures have areas 36 cm² and 81 cm². Find the positive length factor from smaller to larger. [3 marks]

8. A reflection and a positive factor-2 enlargement are applied separately to a scalene triangle. Which preserves area? Which preserves angle sizes? [3 marks]

9. Construct an equilateral triangle with side length 5 cm using a compass and straightedge. Explain the equality of the sides. [4 marks]

10. $A(0, 0)$ and $B(6, 0)$ are endpoints of a segment. A candidate bisector is $x = 3$. Explain why it is correct. [3 marks]

11. In an angle-bisector construction, why should the first arc be centred at the angle's vertex? [3 marks]

12. Start at $P(2, -1)$. Compare these two procedures. [4 marks]

(a) Translate by $(-1, 3)$, then enlarge by factor 3 from the origin. [2 marks]

(b) Enlarge by factor 3, then translate by $(-1, 3)$. Is it the same image? [2 marks]

13. A procedure for an equilateral triangle draws a circle of radius AB at A, but radius $\frac{AB}{2}$ at B. Why does its justification fail? [3 marks]

14. Before attempting a compass construction, a student is given triangle sides 2 cm, 3 cm and 6 cm. Explain why the procedure should reject this input. [3 marks]

15. Two triangles have angles 38°, 72° and 70°. One has a 4 cm side corresponding to a 6 cm side in the other. State whether they are similar and whether they are congruent. Explain. [3 marks]

16. A claimed midpoint rule is $M = \left(\frac{x_2 - x_1}{2}, \frac{y_2 - y_1}{2}\right)$. Give a numerical counterexample and the corrected formula. [4 marks]