Explaining what stays unchanged

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. A 5 cm by 2 cm rectangle is reflected. Find its image perimeter and area. [2 marks]

The side lengths stay 5 and 2.

$2(5 + 2) = 14$ and $5 \times 2 = 10$.

Answer: Perimeter 14 cm; area 10 cm^2.

2. Which properties stay unchanged under a translation: coordinates, side lengths, angle sizes, area? [2 marks]

Coordinates generally change because the shape changes position.

Translation does not stretch the shape.

Answer: Side lengths, angle sizes and area.

3. A triangle is rotated 90°. Does its clockwise vertex order reverse? Explain. [2 marks]

All vertices turn together about the centre; there is no mirror reversal.

Answer: No. A rotation preserves clockwise/anticlockwise order.

4. A rule maps a 2 cm side to a 4 cm side. Could it be a translation, reflection or rotation? Explain. [2 marks]

The side has doubled, so the rule includes a size change.

Answer: No. Each of those transformations preserves side lengths.

5. A right triangle has perpendicular sides 4 units and 3 units. It is reflected in the y-axis. Find its area and state whether it is congruent to the original. [3 marks]

$\frac{1}{2} \times 4 \times 3 = 6$.

Reflection preserves all corresponding lengths and angles.

Answer: Area 6 square units; congruent.

6. A student claims two shapes must be congruent because they have equal area. Is this enough? Give a counterexample. [3 marks]

Equal area alone does not establish equal corresponding lengths and angles.

Answer: No. A 1 by 6 rectangle and a 2 by 3 rectangle both have area 6 but different side lengths.