Worked answers | Geometry and proof

Angle and similarity reasoning

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. Two parallel lines are cut by a transversal. An alternate angle is 72°. Find its matching alternate angle and state the reason. [2 marks]

Alternate angles between parallel lines are equal.

Answer: 72°

2. A triangle has angles 36° and 91°. Find the third. [2 marks]

$180 - 36 - 91 = 53.$

Answer: 53°

3. Triangles have angle sets $50^\circ, 60^\circ, 70^\circ$ and $70^\circ, 50^\circ, 60^\circ$. Are they similar? Explain. [2 marks]

Match equal angles; AA similarity applies.

Answer: Yes.

4. Similar triangles ABC and DEF have $A \leftrightarrow D, B \leftrightarrow E, C \leftrightarrow F$. $AB = 8, DE = 12, BC = 10$. Find EF. [2 marks]

Scale factor $\frac{12}{8} = 1.5.$

$EF = 10 \times 1.5 = 15.$

Answer: 15

5. A transversal makes equal corresponding angles with two lines. What can be concluded about the lines? [2 marks]

Use the converse of the corresponding-angle theorem.

Answer: They are parallel.

6. A student says two triangles are similar because both contain a 40° angle. Give a counterexample using angle sets. [3 marks]

Both contain 40° but the other angles differ.

One equal angle is insufficient.

Answer: For example $40^\circ, 60^\circ, 80^\circ$ and $40^\circ, 70^\circ, 70^\circ$.