

Congruence Similarity

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Triangle P has sides 5 cm, 7 cm, 9 cm. Triangle Q has sides 9 cm, 5 cm, 7 cm. Are they congruent?

Step 1 · Compare the three sides (order does not matter)

Both have 5, 7 and 9 cm

Step 2 · Three equal sides

SSS condition is met

Answer: Yes — congruent (SSS)

Check: Three sides fix a triangle completely, so the shapes must be identical ✓

2. Now try one with the steps

Two triangles are similar. A side of 4 cm in the small one matches 10 cm in the large one. Another side is 6 cm in the small one. Find its match.

Step 1 · Scale factor = large $\div$ small

Step 2 · Multiply the other side

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Congruent shapes are the same in which two ways? [1]

2. Do similar shapes always have equal angles? [1]

3. A 3 cm by 5 cm rectangle is enlarged by scale factor 2. What are its new dimensions? [1]

4. Which congruence condition uses two sides and the angle between them? [1]

5. Two similar triangles: the first has angles 40° , 60° and 80° . The second has angles of 60° and 40° . What is its third angle? [1]

6. Are a $4\text{ cm} \times 6\text{ cm}$ rectangle and a $6\text{ cm} \times 9\text{ cm}$ rectangle similar? [2]

7. Are a $4\text{ cm} \times 6\text{ cm}$ rectangle and a $6\text{ cm} \times 8\text{ cm}$ rectangle similar? [2]

8. A side of 8 cm becomes 20 cm in a similar shape. What is the scale factor? [1]

9. A triangle has sides 3 cm , 5 cm and 6 cm . A similar triangle has a shortest side of 9 cm . Find its longest side. [2]

10. A triangle has sides of 10 cm and 15 cm . In a smaller similar triangle, the 10 cm side becomes 4 cm . Find the side that matches 15 cm . [2]

11. A 2 m pole casts a 3 m shadow. At the same time a building casts a 24 m shadow. How tall is the building? [2]

12. A 10 cm by 15 cm photo is enlarged so that its width becomes 25 cm . What is its new height? [2]

13. In an 'A' shape, a small triangle has base 4 cm and side 5 cm . The large similar triangle around it has base 10 cm . Find the large triangle's matching side. [3]

14. A model car is 8 cm long and the real car is 4 m long. What is the scale factor from the model to the real car? [2]

15. Why do three equal angles (AAA) show that two triangles are similar but not that they are congruent? [2]

4. Before you hand it in

A side of 4 cm becomes 7 cm, so the side of 6 cm becomes 9 cm (adding 3)

Similar shapes are enlargements: multiply. Scale factor = $7 \div 4 = 1.75$, so 6 cm becomes $6 \times 1.75 = 10.5$ cm.

Assuming two rectangles are similar because they are both rectangles

Check that BOTH pairs of sides use the same scale factor. A 4×6 and a 6×8 rectangle are not similar.

Matching the wrong pair of sides

Match sides by the angles at their ends, or redraw both shapes the same way round before finding the scale factor.

Saying two triangles are congruent because all three angles match

Congruence needs at least one side: SSS, SAS, ASA or RHS. Matching angles alone allow different sizes.