MATHEMATICS · GRADES 7-9

Similar Figures

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you enlarge a photo for a poster or shrink a drawing to fit a page, keeping its shape exactly the same while every length scales together. A poster printer enlarging a photo keeps every length in the same proportion, so faces do not stretch. A student copying a diagram smaller for a notebook keeps the shape true by scaling every side by the same factor. Knowing similar figures tells you how to resize a shape without changing what it looks like, and how to work out a missing length from the scale.



Rule

Similar figures: similar figures have exactly the same shape.

Matching angles are equal, and matching sides are in the same ratio. Any side = matching side × scale factor.

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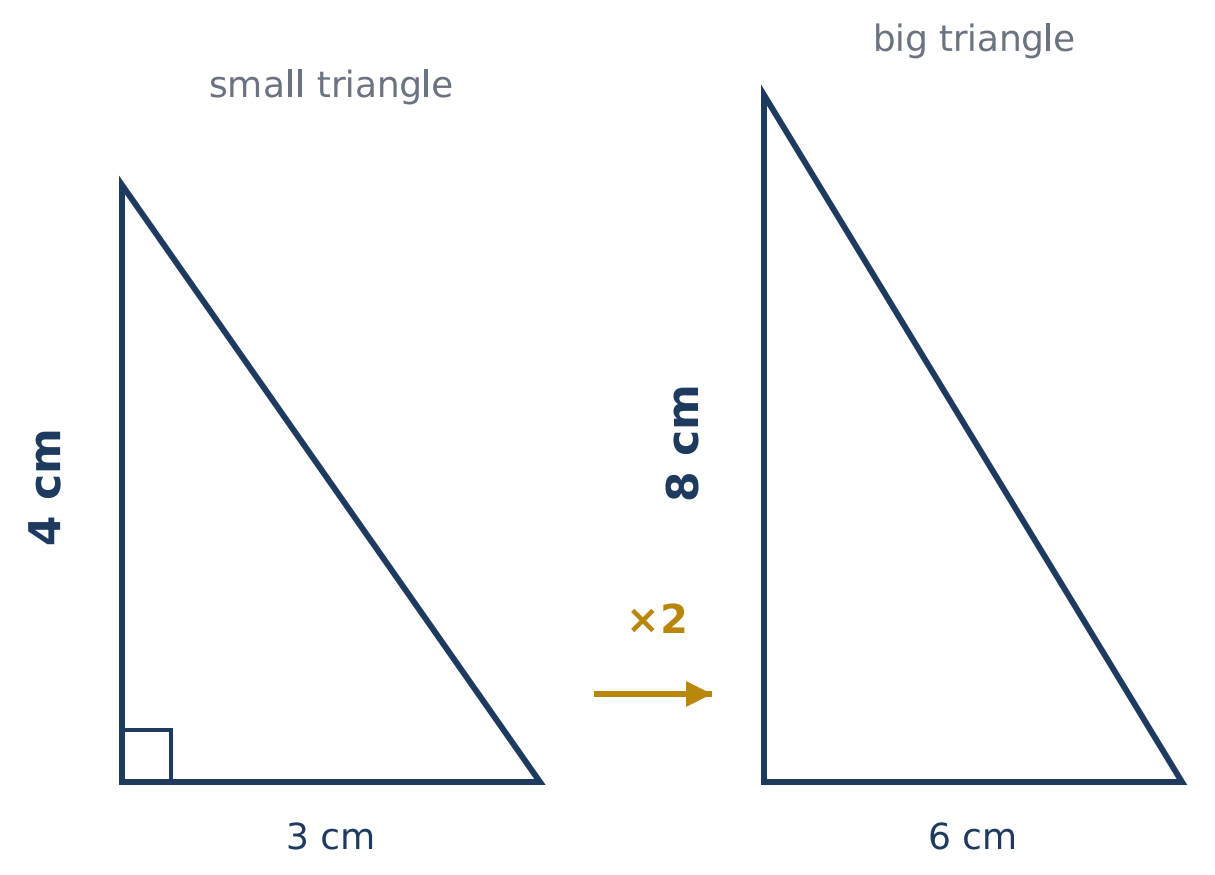
Worked examples

EXAMPLE 1

Q Two triangles are similar. One side is 4 cm and the matching side is 8 cm. What is the scale factor?



SOLUTION

Scale factor = matching length ÷ original length.

8 ÷ 4 = 2

The scale factor is 2.

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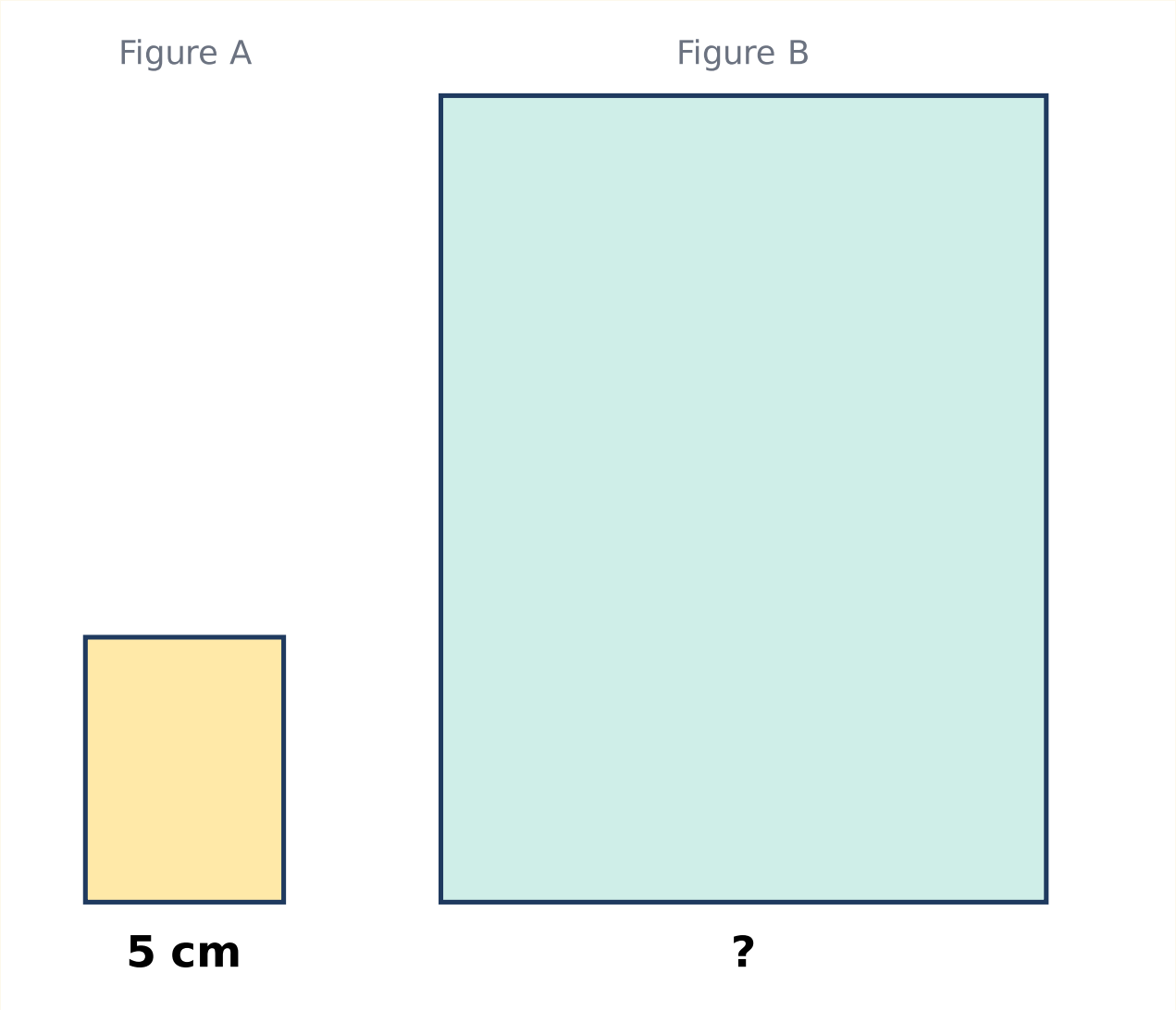
EXAMPLE 2

Q Two rectangles are similar with scale factor 3. A side of 5 cm enlarges to what?



SOLUTION

Multiply the original side by the scale factor.

$5 \times 3 = 15$

The enlarged side is 15 cm.

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Practice questions

1. Two triangles are similar. One side is 6 cm and the matching side is 18 cm. What is the scale factor?

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2. Two rectangles are similar with scale factor 4. A side of 6 cm enlarges to what?

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3. Scale factor 2. The enlarged side is 6 cm. What was the original side?

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4 Scale factor $\frac{1}{2}$, side 8 cm. New side?

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5 Matching sides 6 cm and 3 cm. What is the scale factor from the first to the second?

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6 Scale factor $\frac{1}{2}$. The enlarged side is 5 cm. What was the original side?

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7 **Similar triangles have an angle of 50 degrees. What is the matching angle?**

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8 **Scale factor 4, side 2 cm. New side?**

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9 **Scale factor 3. The enlarged side is 21 cm. What was the original side?**

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10 Two triangles are similar. One side is 3 cm and the matching side is 12 cm. What is the scale factor?

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ANSWER KEY

1. 3

2. 24 cm

3. 3 cm

4. 4 cm

5. $\frac{1}{2}$

6. 10 cm

7. 50 degrees

8. 8 cm

9. 7 cm

10. 4

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