

Scale Up Shapes

Use valid figures, correspondence and proportional reasoning

GRADE 7 • 7.MG.2

7.MG.2 "The student will solve problems and justify relationships of similarity using proportional reasoning. Identify corresponding congruent angles of similar quadrilaterals and triangles, through the use of geometric markings..."

NAME _____

DATE _____

BUILD UNDERSTANDING

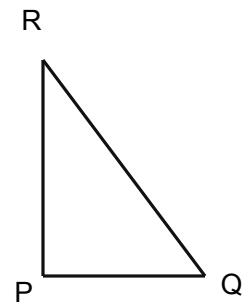
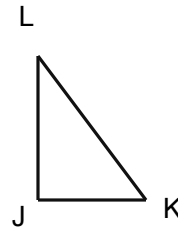
Similar figures have equal corresponding angles and one common ratio between corresponding sides. Match endpoints in order, even when a shape is turned. Write both ratios in the same direction. A shape that only looks alike may fail the side-ratio test.

WORKED EXAMPLE

Triangles JKL and PQR are similar in that order. JK = 3, JL = 4, KL = 5 cm; PQ = 4.5 cm. Find PR.

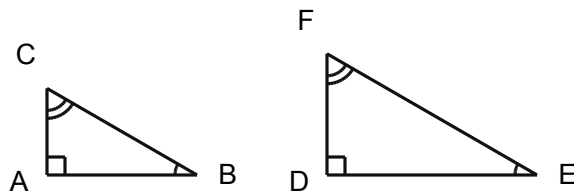
1. Use the similarity order to match endpoints.
2. Apply the same scale factor to corresponding sides.

Answer: J matches P and L matches R, so JL matches PR. Scale factor = $4.5/3 = 1.5$; $PR = 4 \times 1.5 = 6$ cm.

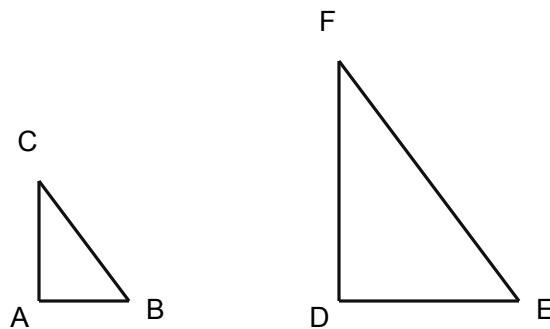


PRACTICE 4 problems

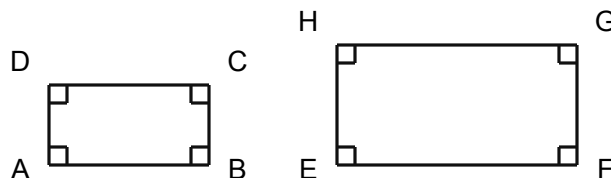
- 1** Matching marks show corresponding angles. List all three angle pairs and write a similarity statement using symbols. If angle A = 90 degrees and B = 30 degrees, find angle F.



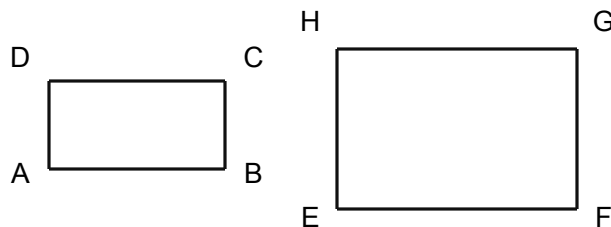
- 2** Triangle ABC ~ triangle DEF. AB = 3, BC = 5, AC = 4 cm; DE = 6 and DF = 8 cm. Write a proportion and find EF.



- 3** Rectangle ABCD has AB = 4 and BC = 2 cm. Rectangle EFGH has EF = 6 and FG = 3 cm. Are they similar? Justify using angles and both side ratios.

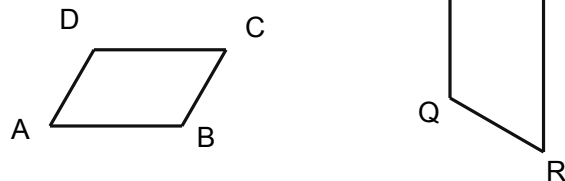


- 4 These rectangles have sides 4 by 2 cm and 6 by 4 cm. Are they similar? Use corresponding side ratios to justify; right angles alone are not enough.



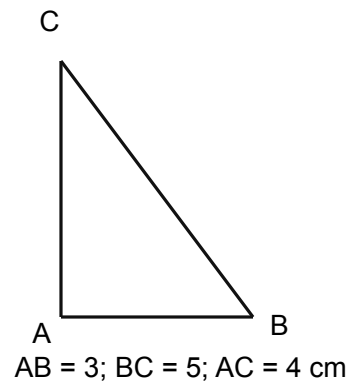
APPLY IT Show your work

- 1 A sign is enlarged and turned. Parallelogram $ABCD \sim PQRS$; angle A is 60 degrees. Find angles Q and R, and explain why the turn changes neither.

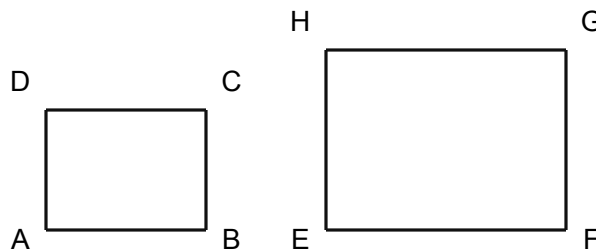


2

This triangular garden drawing uses 1 cm to represent 2.5 m. Find all three actual side lengths and its perimeter. Write one corresponding-side proportion.

**CHALLENGE** One step up

Rectangle ABCD is 4 cm wide and 3 cm tall. Similar rectangle EFGH is 6 cm wide. A student divides 3 by 1.5 to find its height. Explain the error, give the correct height and write a proportion.



Accept reversed side names and equivalent proportions with a consistent direction. The two rectangles in Practice 4 are intentionally not similar. All other stated pairs are genuinely similar. Use the given measurements; perspective or page size is not a new scale. Require matching-angle evidence, similarity notation, side ratios and contextual units.

PRACTICE 1

Angle A corresponds to D, B to E, C to F. Triangle ABC ~ triangle DEF. Angle F = C = $180 - 90 - 30 = 60$ degrees.

PRACTICE 2

$AB/DE = BC/EF = AC/DF$. Thus $3/6 = 5/EF$, so $EF = 10$ cm. All corresponding sides have scale factor 2.

PRACTICE 3

Yes. All angles are 90 degrees and $6/4 = 3/2 = 1.5$, so corresponding sides share one scale factor.

PRACTICE 4

No. In the stated order, $6/4 = 1.5$ but $4/2 = 2$. The side ratios differ even though every angle is right.

APPLY IT 1

Angle Q = B = 120 degrees and angle R = C = 60 degrees. Rotation and enlargement preserve corresponding angles.

Adjacent parallelogram angles sum to 180, so B = $180 - 60 = 120$. Opposite angles are equal, so C = A = 60.

APPLY IT 2

AB: 7.5 m; BC: 12.5 m; AC: 10 m. Perimeter: 30 m. One proportion is $3/7.5 = 4/10$.

Multiply each drawing length by 2.5: $3 \times 2.5 = 7.5$; $5 \times 2.5 = 12.5$; $4 \times 2.5 = 10$. Add $7.5 + 12.5 + 10 = 30$.

CHALLENGE

The enlargement factor is $6/4 = 1.5$, so multiply: height = $3 \times 1.5 = 4.5$ cm. A valid proportion is $4/6 = 3/4.5$.