

Scale It Up

Use ratios to solve similarity and circle problems.

GRADE 7 • TEKS 7.5

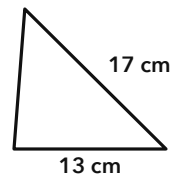
7.5 "Proportionality. The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to: generalize the critical attributes of similarity..."

NAME _____

DATE _____

ONE CONSTANT SCALE

Similar polygons have equal corresponding angles and proportional corresponding side lengths. Ratios of corresponding sides use the same length unit to give a dimensionless scale factor. A mixed-unit comparison, such as feet per centimeter, is a conversion rate. Ratios of sides within one shape match the corresponding within-shape ratios in a similar shape. For every circle, circumference divided by diameter is π , approximately 3.14.

**WORKED EXAMPLE**

A triangular banner has sides of 13 cm and 17 cm. In a similar banner, the corresponding first side is 65 cm. Find the side corresponding to 17 cm.

1. Find the scale factor: $65/13 = 5$.
2. Multiply the matching side: 17×5 .
3. The matching side is 85 cm.

Answer: 85 cm

PRACTICE 4 problems

- 1** A game designer enlarges a character card. The original is 6 cm wide and 9 cm tall. The new card is 10 cm wide. How tall is it?

ANSWER _____

- 2** A model skateboard ramp is $7/2$ inches long. Its scale is 1:16. What is the actual ramp length?

ANSWER _____

- 3** A club measures a round sticker: circumference 62.8 cm, diameter 20 cm. Find C/d . What number does this measurement approximate, and would a larger circle have a different exact C/d ?

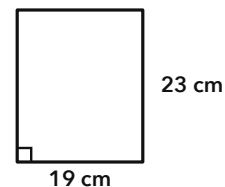
ANSWER _____

- 4** Rectangle A is 8 cm wide and 12 cm tall. Similar rectangle B is 14 cm wide and x cm tall. Find x . Compare width/height within each rectangle and B/A for both corresponding sides. What stays equal in general?

ANSWER _____

APPLY IT Show your work

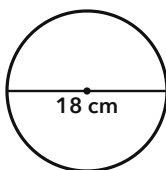
- 1** The mural sketch has a shorter side of 19 cm and a longer side of 23 cm. On the similar actual mural, the shorter side is 57 ft. Find the longer side, showing the units in your rate.



ANSWER _____

2

A robotics team uses the circular logo shown on a team banner. What is the logo's circumference? Leave the answer in terms of π .

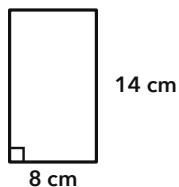


ANSWER _____

CHALLENGE

One step up

A design team says the card shown is a scale drawing of a 20 m by 35 m sign. Is the claim correct? Explain by comparing the two scale ratios.



PRACTICE 1

$10/6 = 5/3$, so the height is $9 \times 5/3 = 15$ cm.

PRACTICE 2

56 inches

PRACTICE 3

$62.8/20 = 3.14$, an approximation of π . Every circle has exact $C/d = \pi$, independent of size.

PRACTICE 4

$x = 21$ cm. Within: $8/12 = 14/21 = 2/3$. Between: $14/8 = 21/12 = 7/4$. Similar rectangles preserve corresponding within-shape ratios; every B/A side ratio equals one common factor, with equal corresponding angles.

APPLY IT 1

69 ft

57 ft / 19 cm = 3 ft per cm. Then 23 cm $\times$ 3 ft/cm = 69 ft. The number 3 is a mixed-unit rate, not the dimensionless enlargement factor. Converting feet to centimeters first would give $1737.36/19 = 91.44$.

APPLY IT 2

18 π cm

Use $C = \pi d$. With diameter 18 cm, $C = 18\pi$ cm.

CHALLENGE

Yes. 20 m = 2000 cm and 35 m = 3500 cm, so $8/2000 = 14/3500 = 1/250$.

Use a common unit for a dimensionless scale factor. Mixed-unit rates must retain their units. Similarity requires corresponding angles and all corresponding side ratios, not one selected pair. Accept equivalent exact forms of 18 π cm for the circle task.