

Lesson 4.3 Using Similar shapes and Scale Drawings

Day 1

Teach objective and review unit “Reading strategies” and “Success for English learners”

Assignment - Guided practice and Independent practice completed as a class

Reading strategies answers

1. 2.5 cm
2. $1/10 = 2.5/x$; $x=25$ ft
3. 4 cm
4. $1/10 = 4/x$; $x=40$ ft

Success for English learners

1. The car would not be in proportion.
2. The photo would have different proportions and the face would be stretched.

Day 2

Review

Cooperative (elbow buddy)assignment 4.3 practice and problem solving: D

4.3 Practice and problem solving: A/B

Login to Go Math

Go to the Resources Tab

Click on the Student Online Edition (yellow open book)

This will take you to another window to an interactive student edition textbook.

Go to page 127

Answers to “reflect”, Explore activity” and “your turn” questions

EA. 9, 12, 15, 18

1. 12 feet
2. 44 inches
3. For 18 feet of actual length, the blueprint shows 24 inches. 2 times 18 gives 36 feet, which would be shown as 24 times 2, or 48 inches in the blueprint. Thus, for 33 feet, 44 inches is reasonable.
4. For side labeled 28 inches, set up the proportion $2 \text{ in} / 3 \text{ ft} = 28 \text{ in} / x \text{ ft}$, and solve to find $x=42$. Set up and solve a similar proportion for the side labeled 11 inches.
5. length about 17.3 in, width about 13.3 in; $17.3 * 13.3 = 230.1$ sq feet
6. The length is 22 feet and the width is 10 feet. The area is $22 * 10 = 220$ sq feet. The lengths of the hall are $8 * 3 = 24$ m and $6 * 3 = 18$ m. Using the new drawings and scale, the answers are correct because both scales give the same actual lengths.

For answers to the guided practice and independent practice, see Coach Gammon.

Additional web sites

https://www.youtube.com/watch?v=xtz4X7jx_1A

<https://www.youtube.com/watch?v=XtkU4VkWh8I>

Remember, on the online edition, you can click on the “math on the spot” for a little extra teaching from Prof Burger. If you only have your book, use a QR scanner on the “math on the spot”

Using Scale Drawings to Solve Problems

How can you use scale drawings to solve problems?
 Scale drawings _____ measurements of _____ or places.

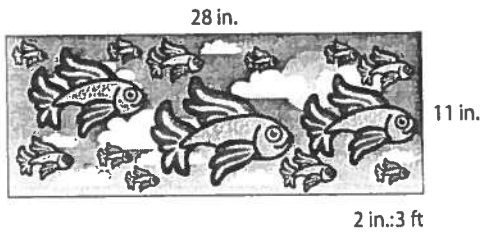
Find _____ of actual objects
 Make a completed table by solving with _____

Vocab

_____ - a proportional 2 dimensional drawing of an object.

_____ - a ratio between 2 sets of measurements

The art class is planning to paint a mural on an outside wall. This figure is a scale drawing of the wall. What is the area of the actual wall?



STEP 1 Find the number of feet represented by 1 inch in the drawing.

$$\frac{2 \text{ in.} \div 2}{3 \text{ ft} \div 2} = \frac{1 \text{ in.}}{1.5 \text{ ft}}$$

1 inch in this drawing equals 1.5 feet on the actual wall.

STEP 2 Find the height of the actual wall labeled 11 inches in the drawing.

$$\frac{1 \text{ in.} \times 11}{1.5 \text{ ft} \times 11} = \frac{11 \text{ in.}}{16.5 \text{ ft}}$$

The height of the actual wall is 16.5 ft.

STEP 3 Find the length of the actual wall labeled 28 inches in the drawing.

$$\frac{1 \text{ in.} \times 28}{1.5 \text{ ft} \times 28} = \frac{28 \text{ in.}}{42 \text{ ft}}$$

The length of the actual wall is 42 ft.

STEP 4 Since area is length times width, the area of the actual wall is $16.5 \text{ ft} \times 42 \text{ ft} = 693 \text{ ft}^2$.

Actual length (ft)				

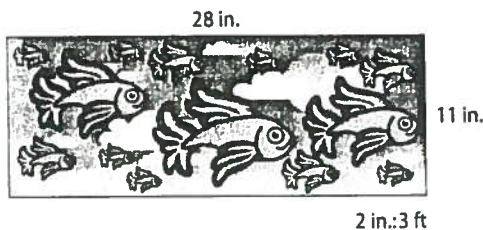
Using Scale Drawings to Solve Problems

How can you use scale drawings to solve problems?
 Scale drawings represent measurements of actual object or places.

Find dimensions of actual objects
 Make a completed table by solving with proportions.

Vocab
Scale drawing - a proportional 2 dimensional drawing of an object.
Scale - a ratio between 2 sets of measurements.

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Actual length (ft)

LESSON
4-3

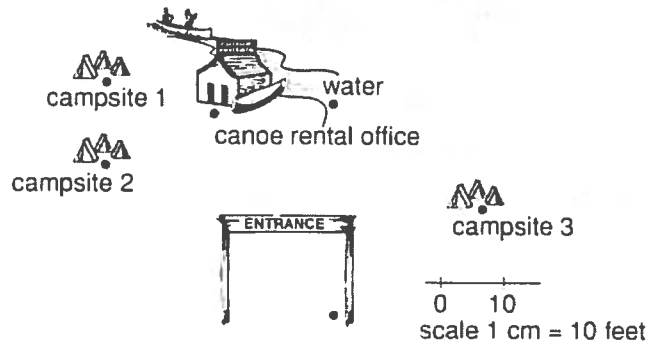
Similar Shapes and Scale Drawings

Reading Strategies: Read a Map

A **scale drawing** has the same shape, but is not the same size, as the object it represents. A map is an example of a scale drawing.

This is a map of a campground. The scale is 1 cm:10 ft.

To find how far the campground entrance is from the canoe rental office, follow the steps. Use a centimeter ruler to measure.



Step 1: Measure the distance in centimeters.

—————> The distance is 3 centimeters.

Step 2: Set up a proportion using the map scale as one ratio.

—————> $\frac{1 \text{ cm}}{10 \text{ ft}} = \frac{3 \text{ cm}}{x \text{ ft}}$

Step 3: Use the proportion. —————> $x = 3 \cdot 10$

Step 4: Solve to find the value of x. —————> $x = 30$

The campground entrance is 30 feet from the canoe rental office.

Use the map to answer each question.

1. How many centimeters is Campsite 3 from the water?

2. Write a proportion to find the distance from Campsite 3 to the water.

3. How many centimeters is Campsite 3 from the canoe rental office?

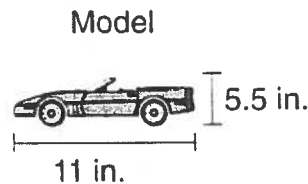
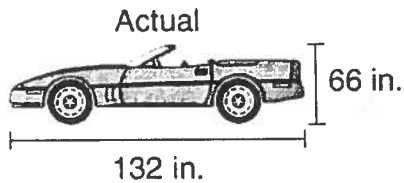
4. Write a proportion to find the distance from Campsite 3 to the canoe rental office.

LESSON
4-3

Similar Shapes and Scale Drawings

Success for English Learners

Problem 1



What is the scale factor?

$$\frac{\text{Model length}}{\text{Actual length}} = \frac{11}{132} = \frac{1}{12}; \quad \frac{\text{Model height}}{\text{Actual height}} = \frac{5.5}{66} = \frac{1}{12}$$

$$\text{Scale factor} = \frac{1}{12}$$

Problem 2

This is a photo of a painting. If you measure the photo, you could find the measurements of the actual painting.



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Scale factor is $\frac{1}{15}$.

$$\frac{1}{15} \rightarrow \frac{\text{photo}}{\text{painting}}$$

Write 2 proportions, one for the length and one for the width.

$$\frac{\text{photo length}}{\text{painting length}} = \frac{1}{15} \qquad \frac{\text{photo width}}{\text{painting width}} = \frac{1}{15}$$

- In Problem 1, what would happen if you used a different scale factor for the length than you did for the width?

- Explain why it is important for the photo and the painting to be in proportion in Problem 2.

LESSON
4-3

Similar Shapes and Scale Drawings

Practice and Problem Solving: D

1. A room in a house is shown on a blueprint. The blueprint has a scale of 5 inches : 8 feet. A wall in the same blueprint is 30 inches. Complete the table. The first column is done for you.

Blueprint Length (in.)	5	10		20		
Actual Length (ft)	8	16	24		40	48

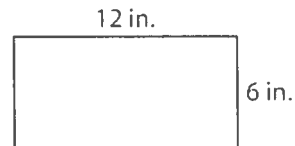
- a. How long is the actual wall? _____
- b. A door in the room has a width of 4 feet. What is the width of the door in the blueprint?
- _____

2. The scale of a room in a blueprint is 2 inches : 1 foot. A window in the same blueprint is 12 inches. Complete the table.

Blueprint Length (in.)	2	4		8		12
Actual Length (ft)	1		3		5	

- a. How long is the actual window? _____
- b. A mantel in the room has an actual width of 8 feet. What is the width of the mantel in the blueprint?
- _____

3. The scale in the drawing is 2 inches : 4 feet. What are the length and width of the actual room? Find the area of the actual room.



Length: _____

Width: _____

Area: _____

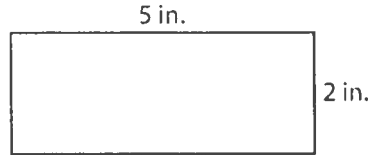
4. A studio apartment has a floor that measures 80 feet by 64 feet. A scale drawing of the floor on grid paper uses a scale of 1 unit : 8 feet. What are the dimensions of the scale drawing?
- _____

LESSON
4-3

Similar Shapes and Scale Drawings

Practice and Problem Solving: A/B

1. The plan of a terrace is shown at right. The scale is 2 inches : 6 feet. What are the length and width of the terrace? Find the terrace's area.

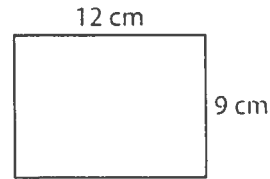


Length: _____

Width: _____

Area: _____

2. The floor plan of a ballroom is shown at right. The scale is 3 centimeters : 4 meters. What are the length and width of the ballroom? Find the ballroom's area.



Length: _____

Width: _____

Area: _____

3. A garage floor measures 150 feet by 120 feet. A scale drawing of the floor on grid paper uses a scale of 1 unit : 15 feet. What are the dimensions of the drawing?

4. The scale model of a skyscraper being built is 4.2 feet tall.
a. When it is finished, the skyscraper will be 525 meters tall. What scale was used to make the model?

- b. The model is made out of a stack of plywood sheets. Each sheet is 0.6 inch thick. How many sheets of plywood tall is the model?

5. You have been asked to build a scale model of a restaurant out of bottle caps. The restaurant is 20 feet tall. Your scale is 2.4 cm : 1 foot.
a. A bottle cap is 1.2 cm tall. About how many bottle caps tall will your model be?

- b. You are out of bottle caps, and decide to use popsicle sticks instead. You measure them, and they are 15.2 cm tall. How many popsicle sticks tall will your model be?
