

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 5-1 Ratios and Units of Measure

### Standard

- B.A.SSE.A.2 Use algebraic structures to solve problems involving proportional reasoning in real-world context.

### Objectives

SWBAT use ratios and rates IOT solve problems.

### Key Concepts

\_\_\_\_\_ - a ratio that compares two quantities.

\_\_\_\_\_ - a rate that has 1 as the denominator.

\_\_\_\_\_ - units used to measure lengths and distances. They include inches, feet, yards, and miles

\_\_\_\_\_ - this system is used around the world and includes meters.

### Examples

1. Perform the following conversions.

a. 17 ft to yards

c. 2 gal to cups

b. 3.426 kg to grams

d. 3.5 L to mL

2. Write the ratio of measurements in lowest terms.

a. 3 in. to 20 ft.

b. 9 yd : 4 ft

3. Choose the best customary unit for expressing the measure of each.

a. weight of a TV

b. height of a room

4. Find each unit rate
- a. 135 miles in 3 hours
  - b. \$15 for 250 copies
5. Which is a better buy? A 10-ounce box of Cinnamon Toast Crunch costs \$3.29 or a 16-ounce box costs \$4.99.
6. The ratio of boys to girls in the senior class at Cordova High is 5:6. If there are 308 seniors, find the number of boys and girls.

-----Lesson 5-1 Independent Practice/Lesson Check-----

**▣ EXERCISES**

Complete.

- |                       |                        |                      |
|-----------------------|------------------------|----------------------|
| 1. 132 in. = _____ ft | 2. 8 yd = _____ in.    | 3. 5 lb = _____ oz   |
| 4. 108 ft = _____ yd  | 5. 256 cups = _____ pt | 6. 5 gal = _____ qt  |
| 7. 3.4 L = _____ mL   | 8. 1085 g = _____ kg   | 9. 4.35 m = _____ cm |
| 10. 8 g = _____ mg    | 11. 3.2 km = _____ m   | 12. 23 mm = _____ m  |

Write each ratio in lowest terms.

- |                            |                            |                             |
|----------------------------|----------------------------|-----------------------------|
| 13. 3 lb to 54 oz<br>_____ | 14. 12 ft to 5 yd<br>_____ | 15. 8 qt to 4 gal<br>_____  |
| 16. 5 g to 2 kg<br>_____   | 17. 520 mm to 4 m<br>_____ | 18. 3 L to 5500 mL<br>_____ |

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## 7-1 Ratios and Proportions

### Standard

- B.A.SSE.A.2 Use algebraic structures to solve problems involving proportional reasoning in real-world context.

### Objectives

- SWBAT find equivalent ratios IOT determine the unit rate.
- SWBAT use ratios and proportions IOT solve problems.

### Key Concepts

An equation stating that two ratios are equal is called a \_\_\_\_\_

In the proportion  $\frac{a}{b} = \frac{c}{d}$ , a and d are called the \_\_\_\_\_ and b and c are called the \_\_\_\_\_. The \_\_\_\_\_ of the extremes \_\_\_\_\_ and the products of the means \_\_\_\_\_ are called the \_\_\_\_\_.

### Examples

1. (I do) Solve the proportion

a.  $\frac{x}{18} = \frac{12}{27}$

b.  $\frac{4}{x+1} = \frac{5}{2x-1}$

2. (I do) Is the pair of ratios equivalent? Show how you know.

a. 28:49, 16:28

b.  $\frac{39}{13}, \frac{36}{9}$

3. (We do) Fine photo charges \$3 for two enlargements. How much does the company charge for five enlargements?

4. (They do) The ratio of counselors to campers is 2:15. There are 102 people at a camp. How many are counselors? How many are campers?

-----Lesson 7-1 Independent Practice/Lesson Check-----

**▣ EXERCISES**

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Solve each proportion.

1.  $\frac{a}{8} = \frac{9}{12}$  \_\_\_\_\_

2.  $\frac{15}{b} = \frac{6}{14}$  \_\_\_\_\_

3.  $\frac{6}{27} = \frac{14}{c}$  \_\_\_\_\_

4.  $\frac{12}{42} = \frac{d}{28}$  \_\_\_\_\_

5.  $\frac{16}{24} = \frac{18}{y}$  \_\_\_\_\_

6.  $\frac{f}{44} = \frac{16}{64}$  \_\_\_\_\_

Solve.

7. A pattern calls for green tiles and blue tiles in a ratio of 3 : 4. How many green tiles are needed if 100 blue tiles are used? \_\_\_\_\_
8. Two entrepreneurs imported crafts for resale. The ratio of their investment was 3 : 5. What was each person's share of the \$12,000 sales income?  
\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 7-2 Similar Polygons

### Standard

- B.A.REI.A.1 Build functions and write expressions, equations, and inequalities for common algebra settings leading to a solution in context (e.g., rate and distance problems and problems that can be solved using proportions).

### Objectives

- SWBAT identify similar polygons IOT find unknown measures of similar polygons.

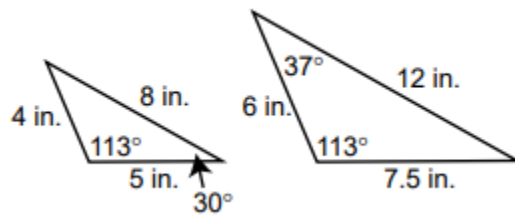
### Key Concepts

\_\_\_\_\_ - have the same shape, but not necessarily the same size

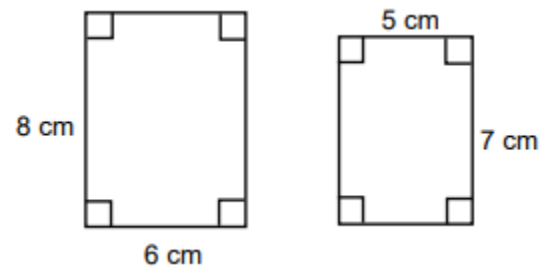
### Examples

1. (I do) Determine if the polygons are similar.

a.

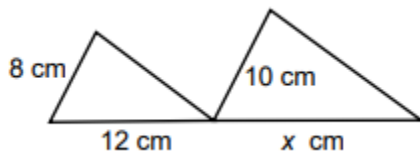


b.

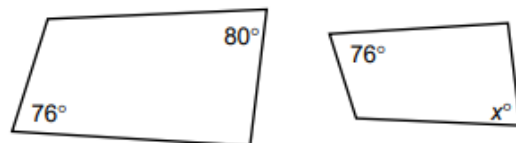


2. (We do) Determine the value of  $x$ .

b.

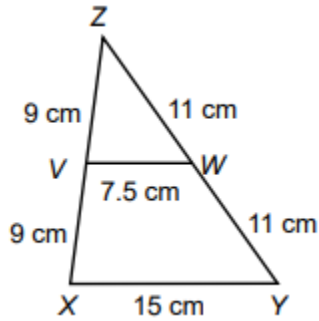


b.

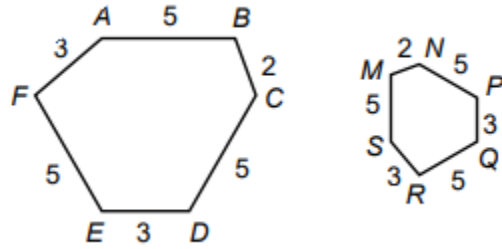


3. (We do) Identify polygons that are similar by writing a similarity statement.

a.



b.

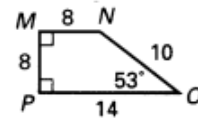
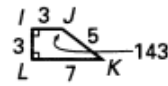
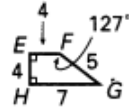
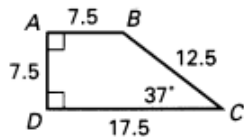


4. (They do) Two mats PQRS and TUVW are cut to display photographs. If the mats are similar figures and  $PS = 40$  cm,  $TW = 60$  and  $SR = 50$ , what is the measure of  $VW$ ?

-----Lesson 7-2 Independent Practice/Lesson Check-----

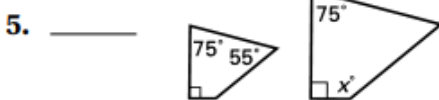
**EXERCISES**

Use these figures to answer Exercises 1–4. Write yes or no and explain why.



1. Is  $ABCD \sim EFGH$ ? \_\_\_\_\_
2. Is  $ABCD \sim IJKL$ ? \_\_\_\_\_
3. Is  $EFGH \sim MNOP$ ? \_\_\_\_\_
4. Is  $IJKL \sim MNOP$ ? \_\_\_\_\_

Find  $x$  in each pair of similar polygons.



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### 7-3 Scale Drawings

#### Standard

- B.A.REI.A.1 Build functions and write expressions, equations, and inequalities for common algebra settings leading to a solution in context (e.g., rate and distance problems and problems that can be solved using proportions).

#### Objectives

- SWBAT use scale drawings IOT find actual or scale length.

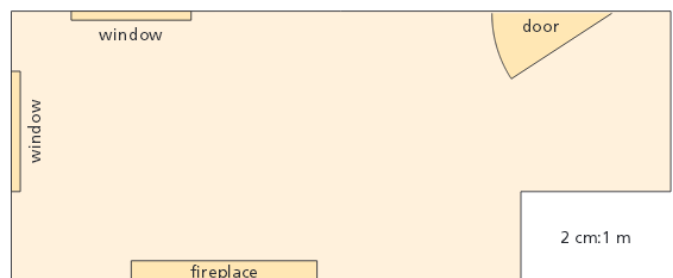
#### Examples

1. (I do) Find the actual length of each of the following.

a. scale length is 2 in., scale is  $\frac{1}{2}$  in. : 3 ft.

b. scale length is 4 cm, scale is 1:200.

2. (I do) This is a scale drawing of a room of a house. In the diagram the distance along the wall between the window and the door is 5 cm. What is the actual distance?



3. (We do) The distance between the front wheels of a model car is 4.5 cm. What is the actual distance on the car if the scale is 1:24?

4. (They do) A photo that measures 3.5 in. by 6 in. will be enlarged so that its width will be 8 in. What will be the length of the enlargement?

-----Lesson 7-3 Independent Practice/Lesson Check-----

**▣ EXERCISES**

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Find the actual measure of each scale item.

1. scale length is 5 cm  
scale is 1 cm : 3 m \_\_\_\_\_

2. scale length is  $1\frac{1}{2}$  in.  
scale is 1 in. : 8 in. \_\_\_\_\_

3. scale distance is 2.5 cm  
scale is 10 cm : 1 km \_\_\_\_\_

4. scale distance is 15 in.  
scale is 5 in. : 2 mi \_\_\_\_\_

Find the scale measure for each item.

5. actual length is 6 ft  
scale is 1 in. : 15 ft \_\_\_\_\_

6. actual length is 45 m  
scale is 3 cm : 10 m \_\_\_\_\_

7. actual distance is 75 mi  
scale is 1 in. : 100 mi \_\_\_\_\_

8. actual distance is 165 km  
scale is 15 cm : 75 km \_\_\_\_\_



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## 7-4 Postulates and Similar Triangles

### Standard

- B.A.REI.A.1 Build functions and write expressions, equations, and inequalities for common algebra settings leading to a solution in context (e.g., rate and distance problems and problems that can be solved using proportions).

### Objectives

- SWBAT use the AA, SSS, and SAS similarity postulates IOT determine if two triangles are similar and solve problems using similar triangles.

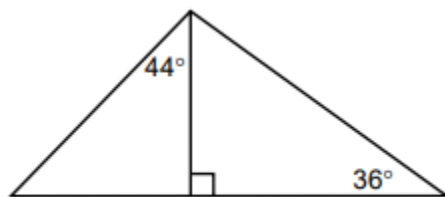
### Key Concepts

Postulate 15 (The AA Similarity Postulate)	If two angles of a triangle are congruent to two angles of another triangle, the two triangles are similar.
Postulate 16 (The SSS Similarity Postulate)	If the corresponding sides of two triangles are proportional, then the two triangles are similar.
Postulate 17 (The SAS Similarity Postulate)	If an angle of one triangle is congruent to an angle in another triangle, and the two sides that include that angle are proportional to the corresponding sides in the other triangle, then the two triangles are similar.

### Examples

1. (I do) Determine whether each pair of triangles is similar. If the triangles are similar, give a reason: write AA, SSS, or SAS.

a.

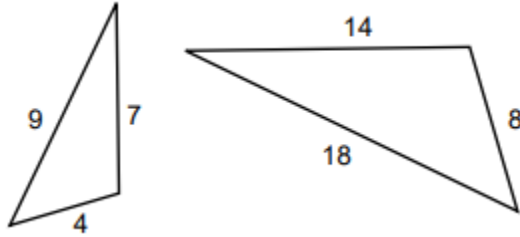


b.

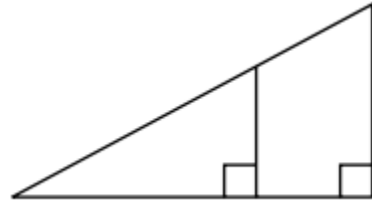


2. (We do) Determine whether each pair of triangles is similar. If the triangles are similar, give a reason: write AA, SSS, or SAS.

a.



b.

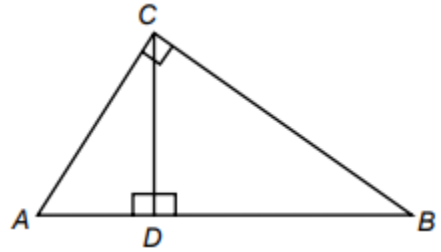


3. (They do)

In  $\triangle ACB$ ,  $\overline{CD} \perp \overline{AB}$ . Can you prove that  $\triangle ADC \sim \triangle CDB$ ? Explain.

\_\_\_\_\_

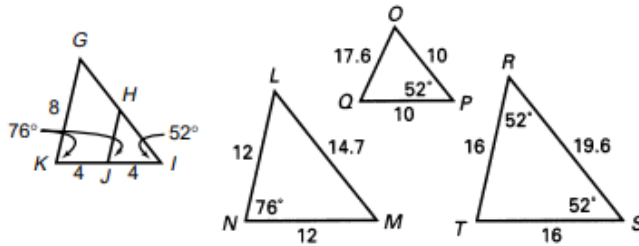
\_\_\_\_\_



-----Lesson 7-4 Independent Practice/Lesson Check-----

**EXERCISES**

Determine whether each pair of triangles is similar. If so, give a reason. Write AA, SSS, or SAS.



1. Is  $\triangle GIK \sim \triangle HIJ$ ? \_\_\_\_\_

2. Is  $\triangle GIK \sim \triangle LMN$ ? \_\_\_\_\_

3. Is  $\triangle GIK \sim \triangle OPQ$ ? \_\_\_\_\_

4. Is  $\triangle LMN \sim \triangle RST$ ? \_\_\_\_\_

5. Is  $\triangle HIJ \sim \triangle RST$ ? \_\_\_\_\_

6. Is  $\triangle OPQ \sim \triangle RST$ ? \_\_\_\_\_

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## 7-5 Triangles & Proportional Segments

### Standard

- B.G.SRT.A.1 Apply similar triangles to solve problems, such as finding heights and distances.

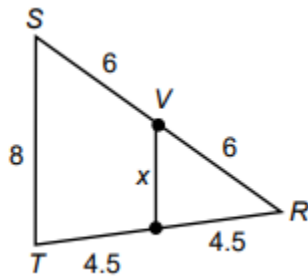
### Objectives

- SWBAT prove triangles are similar IOT find unknown measures of sides of triangles.

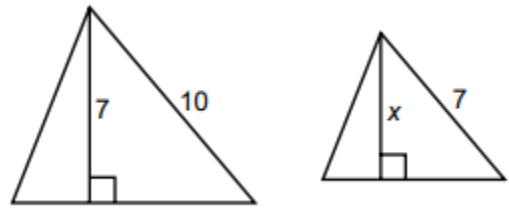
### Examples

1. (I do) Find  $x$  in each pair of similar triangles to the nearest tenth.

a.

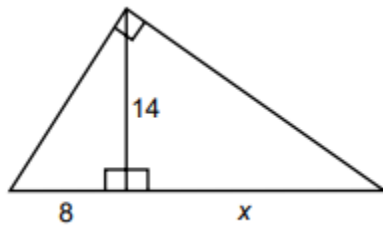


b.

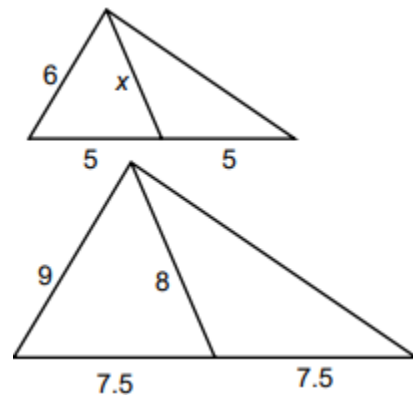


2. (We do) Find  $x$  in each pair of similar triangles to the nearest tenth.

a.



b.



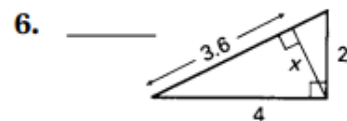
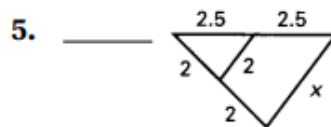
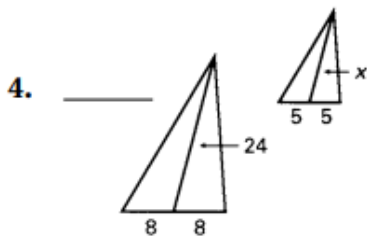
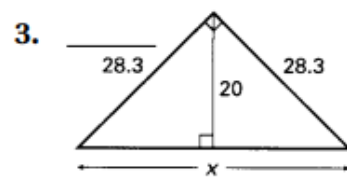
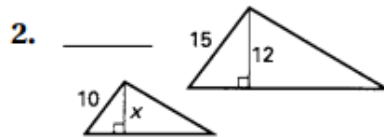
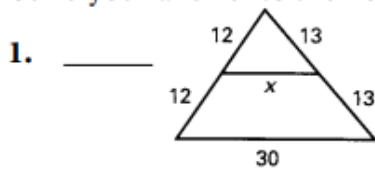
3. (We do)  $\triangle ABC$  is a right triangle with right angle  $C$  and altitude  $CD$ .
- If  $AD = 4$  and  $DB = 9$ , find  $CD$ .

- If  $CA = 12$ ,  $BC = 15$ , and  $AD = 8$ , find  $CD$ .

-----Lesson 7-5 Independent Practice/Lesson Check-----

**EXERCISES**

Find the value of  $x$  in each triangle. Pairs of triangles are similar. Round your answer to the nearest tenth, if necessary.



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## 7-6 Parallel Lines & Proportional Segments

### Standard

- B.A.REI.A.1 Build functions and write expressions, equations, and inequalities for common algebra settings leading to a solution in context (e.g., rate and distance problems and problems that can be solved using proportions).

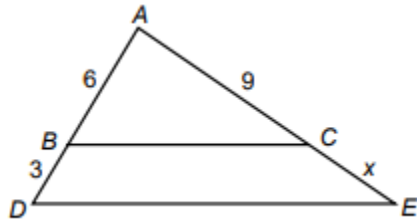
### Objectives

- SWBAT Use properties of parallel lines IOT find unknown measures of sides and angles.

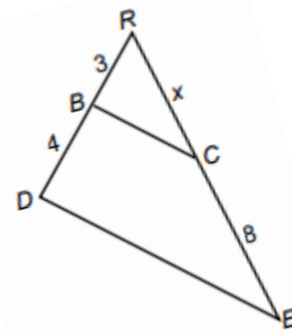
### Examples

1. (I do/We do) In each figure,  $BC \parallel DE$ . Find the value of  $x$  to the nearest tenth.

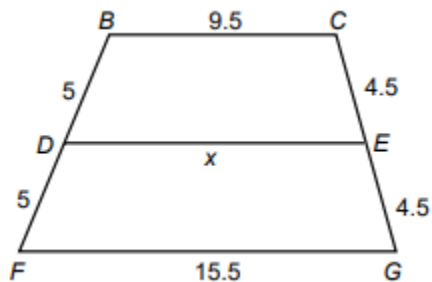
a.



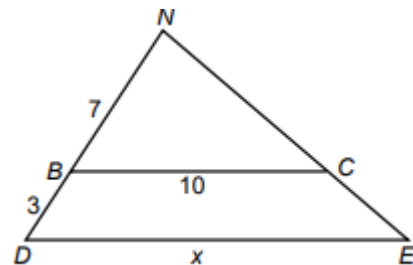
b.



c.



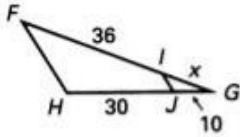
d.



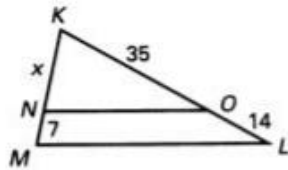
**EXERCISES**

Find the value of  $x$  in each figure. Round your answer to the nearest tenth, if necessary.

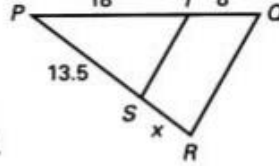
1.  $\overline{FH} \parallel \overline{IJ}$  \_\_\_\_\_



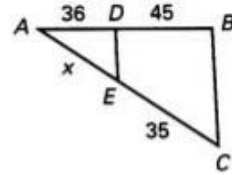
2.  $\overline{ML} \parallel \overline{NO}$  \_\_\_\_\_



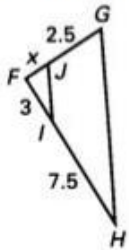
3.  $\overline{ST} \parallel \overline{RQ}$  \_\_\_\_\_



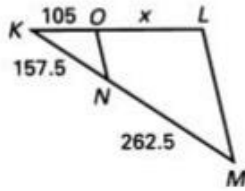
4.  $\overline{DE} \parallel \overline{BC}$  \_\_\_\_\_



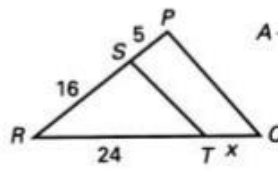
5.  $\overline{JI} \parallel \overline{GH}$  \_\_\_\_\_



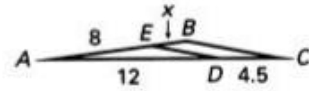
6.  $\overline{ON} \parallel \overline{LM}$  \_\_\_\_\_



7.  $\overline{ST} \parallel \overline{PQ}$  \_\_\_\_\_



8.  $\overline{ED} \parallel \overline{BC}$  \_\_\_\_\_



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## 7-7 Indirect Measurement

### Standard

- B.A.REI.A.1 Build functions and write expressions, equations, and inequalities for common algebra settings leading to a solution in context (e.g., rate and distance problems and problems that can be solved using proportions).

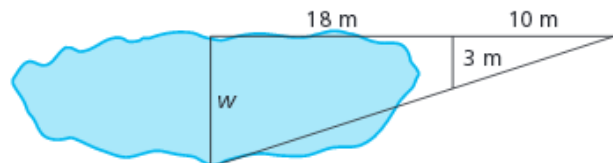
### Objectives

- SWBAT use indirect measurement IOT solve problems.

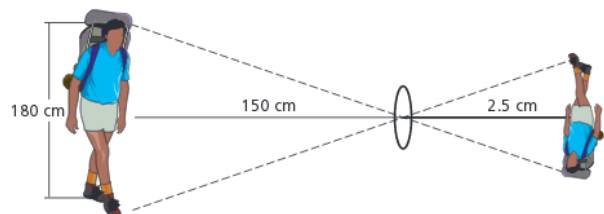
### Examples

1. (I do) A tree casts a shadow 3.3 m long. A meterstick placed perpendicular to the ground at the same time of day casts a shadow that is 0.75 m long. How tall is the tree?

2. (We do) The diagram below shows some measurements that a surveyor was able to take. Describe how she can find the width of the pond of her property by using similar triangles?



3. (We do) Amari is 180 cm from the camera lens. The film is 2.5 cm from the lens. If the person is 180 cm tall, how tall is his image on the film?



4. (They do) To find the height of a tree, a forest ranger places a mirror on the ground 21 ft from the base of the tree. The ranger stands an additional 3 ft from the mirror so she can see the top of the tree reflected in the mirror. If the ranger's eye level is 5 ft from the ground, what is the height of the tree?

-----Lesson 7-7 Independent Practice/Lesson Check-----

▣ **EXERCISES**

Solve. Write any proportions you use to find the solution. Draw a sketch if you wish.

1. A building casts a shadow 25 ft long. A 5-ft person standing next to the building casts a 2-ft shadow. How tall is the building? \_\_\_\_\_
2. To measure the clearance of a highway overpass, a 6-ft tall person places a mirror 9 ft from the bridge. Then he moves 3 ft to where he can see the overpass in the mirror. What is the measure of the clearance? \_\_\_\_\_
3. A 200-cm clothesline pole casts a 300-cm shadow. A garbage can next to the clothesline casts a 105-cm shadow. How tall is the garbage can? \_\_\_\_\_
4. Find the width of the river. \_\_\_\_\_
5. Find the width of the lake. \_\_\_\_\_

