Know that after any of transformation (rotation, reflection, and translation), the shape still has the same size, area, angles and side lengths.
Know that if one shape can become another using rotation, reflection, and translation, then the two shapes are called congruent.
Discover the line of reflection, the center of rotation.
Solve an algebraic proportion
Understand that during transformation called a dilation, (enlargement or reduction), the shape becomes bigger or smaller.

Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective

Week 4, Lesson 1

1. Warm-up
2. Notes
3. ICA
4. Extra Practice:

Language Objectives

I will listen and take notes as the teacher summarizes the properties of transformations.

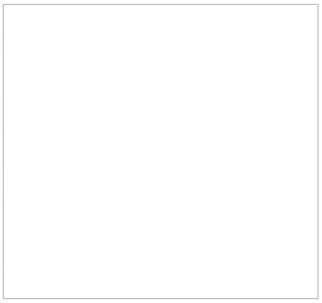
I will compare and contrast the properties of translations, rotations, reflections and dilations.

I will write a summary for transforming a geometric figure.

Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

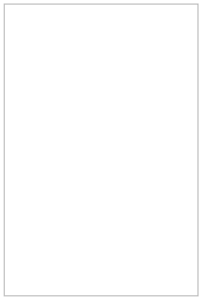
Warm-up: Answer the following questions.

19. Which of the following could represent the sides of a triangle?



19 G-CO.10 19 Geo1.3 19 HS.4.1.PO 9	7 %	16 %	5 %	70 % *

20. What is the distance between the given points $A(5,1)$ and $B(17,-1)$?



20 Geo1.3 20 HS.4.3.PO 3	65 % *	5 %	21 %	6 %

Translations

What is a translation?

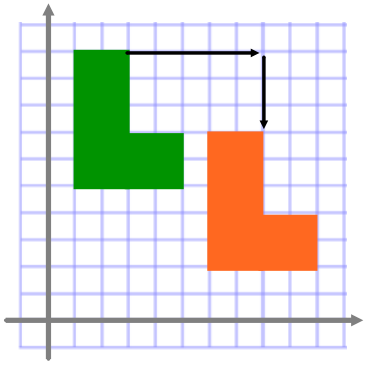
http://www.hstutorials.net/math/geometry/definitions/translation.htm

A **translation** is a transformation that slides each point of a figure the same distance in the same direction.

$$(x, y) \rightarrow (x + 5, y - 3)$$

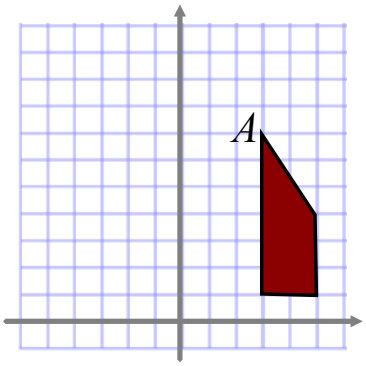
Original Position

Move the figure (5) to the right then (3) down.

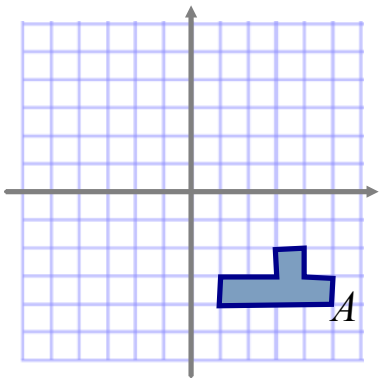


Examples:

$(x, y) \rightarrow (x + 5, y - 3)$



$(x, y) \rightarrow (x + 5, y - 3)$

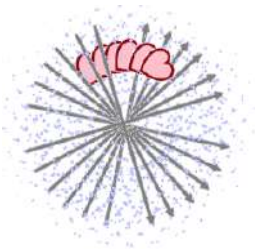


Summary:

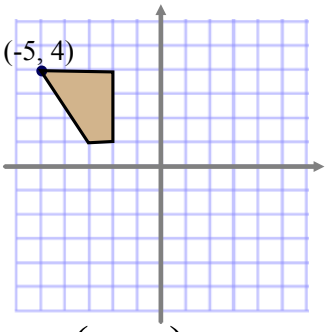
Rotations

What is a rotation?

http://www.hstutorials.net/math/geometry/definitions/rotation.htm

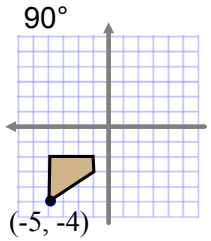


A **rotation** is a transformation that turns a figure around a point.

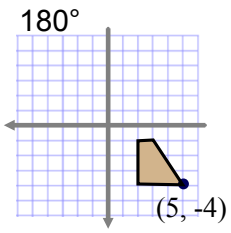


$(x, y) \rightarrow$

Counter clock-wise rotation ↺

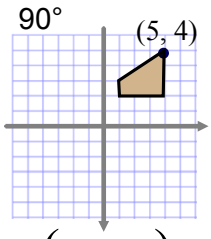


$(x, -y)$

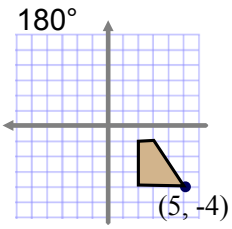


$(-y, -x)$

Clock-wise rotation ↻



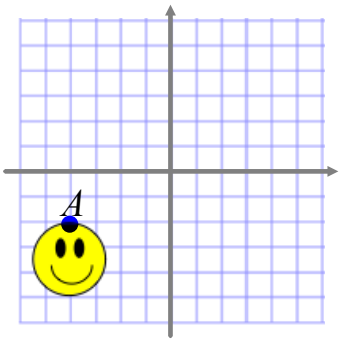
$(-x, y)$



$(-y, -x)$

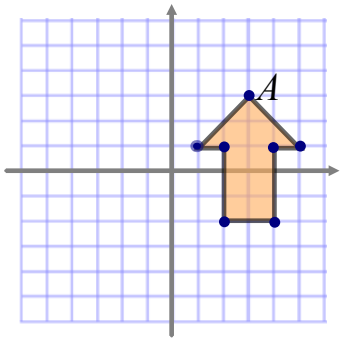
Examples:

Rotate 180 degrees clock-wise



$(x, y) \rightarrow (\_\_\_, \_\_\_)$

Rotate 90 degrees counter clock-wise



$(x, y) \rightarrow (\_\_\_, \_\_\_)$

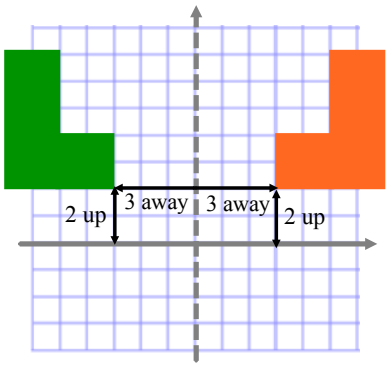
Summary:

Reflections

What is a reflection?

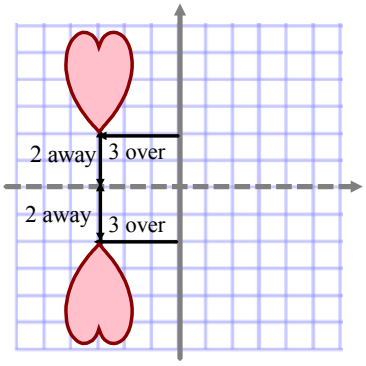
http://www.hstutorials.net/math/geometry/definitions/reflection.htm

A **reflection** is a transformation that flips a figure across a line.



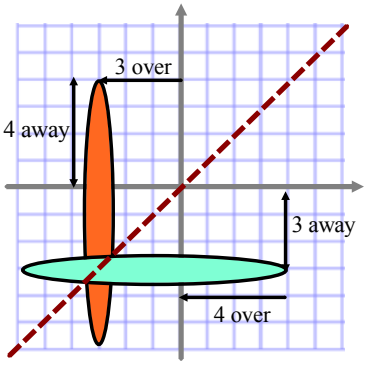
Across the y-axis

$(x, y) \rightarrow (-x, y)$



Across the y-axis

$(x, -y)$

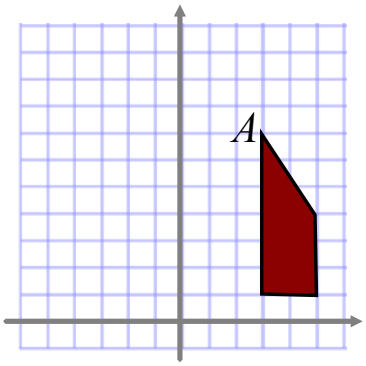


Across the line y = x

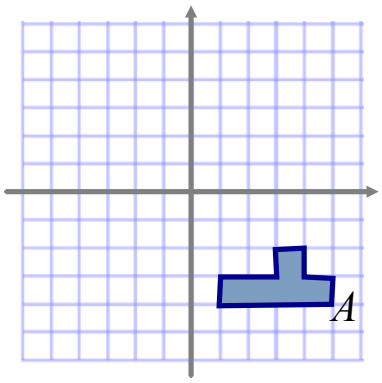
(y, x)

Examples:

$(x, y) \rightarrow (x + 5, y - 3)$



$(x, y) \rightarrow (x + 5, y - 3)$

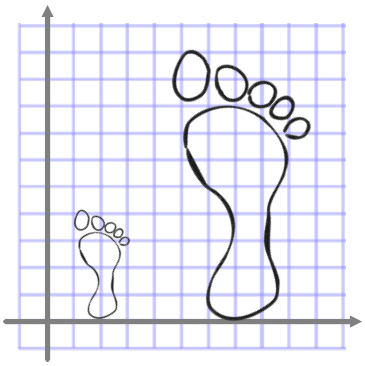


Summary:

Dilations

What is a dilation?

Dilation is a similarity transformation in which a figure is enlarged or reduced using a scale factor $\neq 0$, without altering the center.



Side Length is multiplied by a scale factor

Angles do NOT change

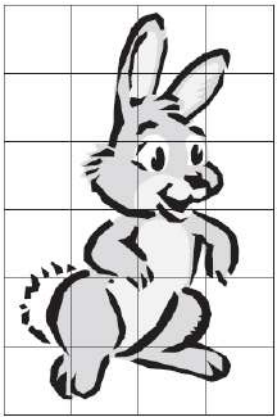
Area changes exponentially

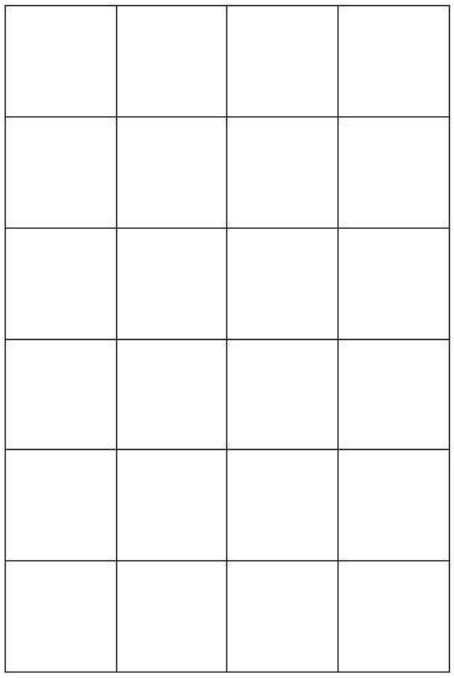
Perimeter is multiplied by a scalar factor

Coordinates are multiplied by a scale factor

Example:

Enlarge the figure





Summary:

What is the image of triangle TGI (2, 9), (-3, 0), and (4, 8) after a dilation of -5?

What is the image of triangle KCN (-12, 0), (0, 54), and (24, 42) after a dilation of $-\frac{1}{6}$?

After a dilation, (7,-11) is the image of (-49,77). What are the coordinates of the image of (70,-28) after the same dilation?

The translation of triangle STO (72, 72), (9, 108), and (-108, -27) after a dilation is (-8, -8), (-1, -12), and (12, 3). What is the dilation (scale factor)?

After a reflection in the x-axis, (10,-3) is the image of point E. What is the original location of point E?

Given triangle HMG with coordinates H(1, -12), M(6, 1), and G(2, 5), find the image of point G after a reflection in the line $y = x$.

After a reflection in the y-axis, (4,-7) is the image of point N. What is the original location of point N?

If the image of point M (10,7) under a translation is M' (7,9), find the coordinate for the same translation for point F (3,-3).

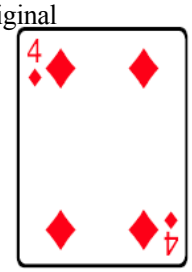
If the image of point C (0,-12) under a translation is C' (-5,-9), find the coordinate for the same translation for point E (7,-8).

The translation of triangle JPC is J'(-8, -5), P'(-10, -4), and C'(-13, -7). If the coordinate of J is (-4,-2), what are the coordinates for P and C?

The translation of triangle APQ is A'(11, -11), P'(-7, 6), and Q'(9, -13). If the coordinate of A is (7,-10), what are the coordinates for P and Q?

Explain (using the correct vocabulary) what happened to the card.

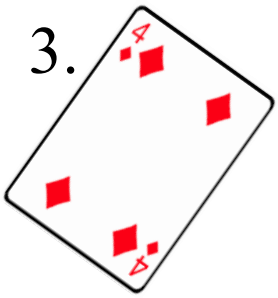
Original



1.

2.

3.



4.

Solve applied problems using the attributes of similar triangles.
Identify similar polygons.
Solve problems using ratio and proportions.

Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective

Week 4, Lesson 2

1. Warm-up
2. Notes
3. ICA
4. Extra Practice

Language Objectives

I will listen and take notes as the teacher guides me through solving similar figure problems.

I will explain the steps required to solve similar figure problems.

I will write a summary for solving similar figure problems.

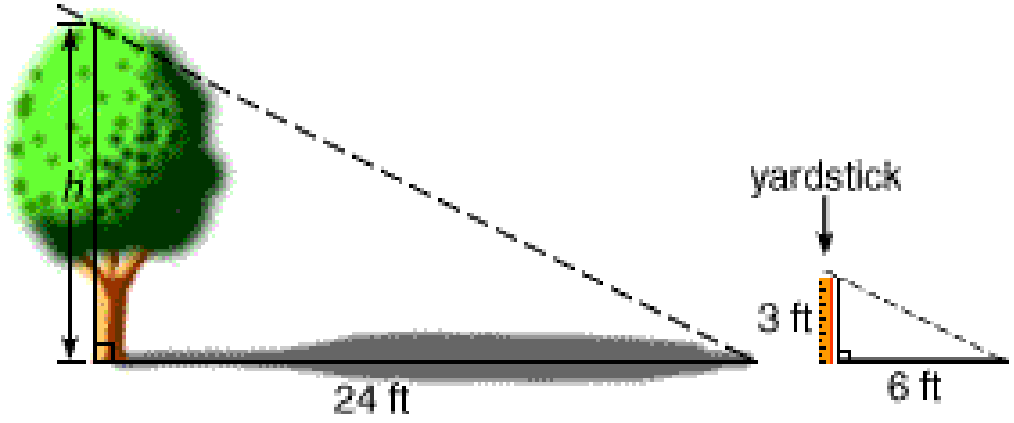
Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm-up: Answer the following questions.

Similar Figures

What are similar figures?

Similar figures are figures that have the same shape but not necessarily the same size.



$\frac{3}{h} = \frac{6}{24}$ ← small triangle / ← large triangle — *Write a proportion.*

$6 \times h = 3 \times 24$ — *Find the cross products.*

$6h = 72$

$\frac{6h}{6} = \frac{72}{6}$ — *Solve the equation.*

$h = 12$

So, the tree is 12 ft tall.

Summary:

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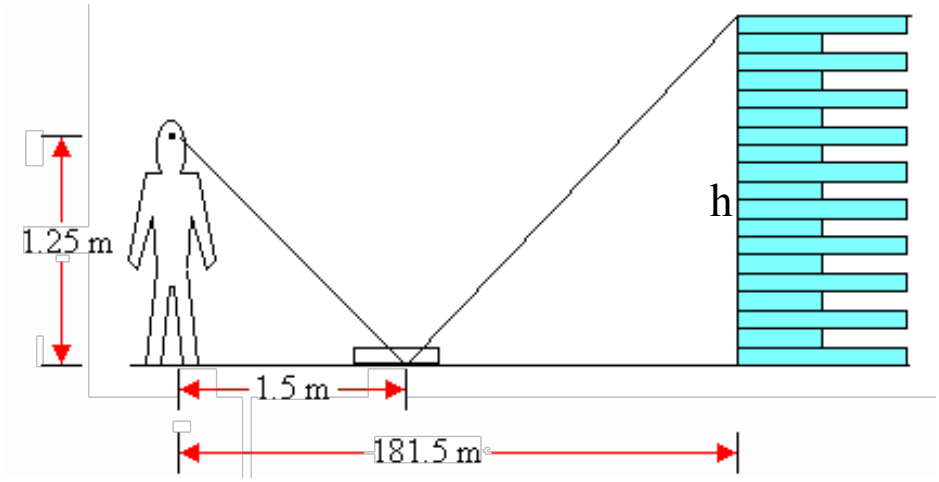
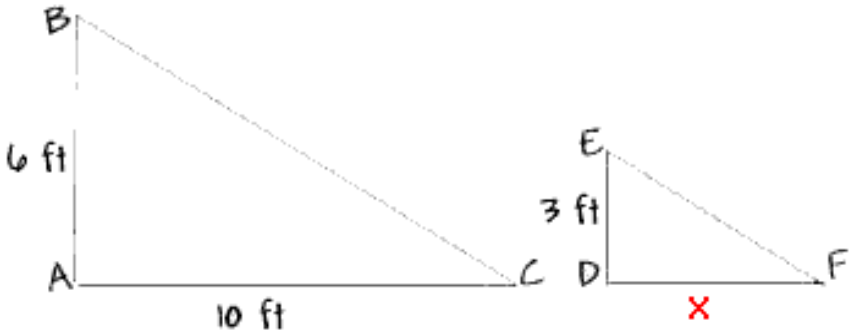
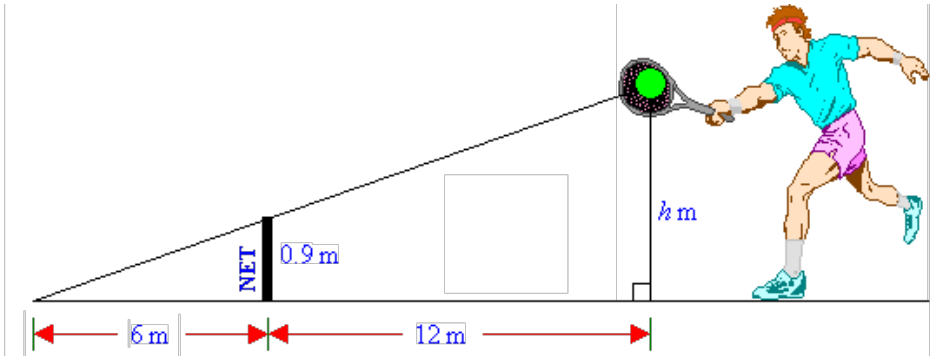
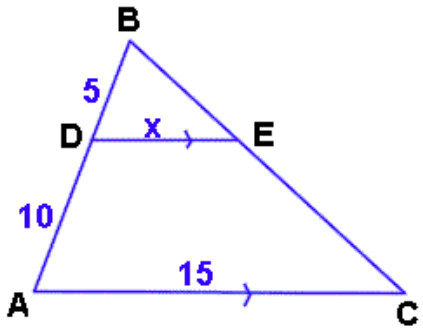
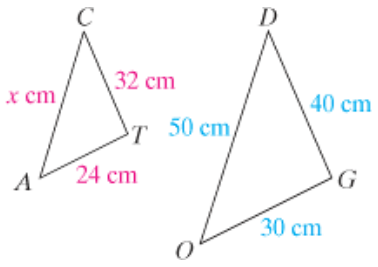
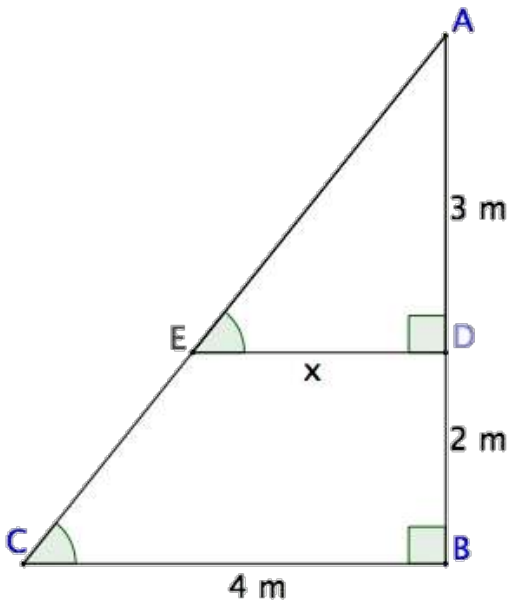





NET
0.9 m
h m
6 m
12 m


B
5
D
x
E
10
15
A
C


C
D
x cm
32 cm
40 cm
50 cm
T
A
24 cm
G
30 cm
O


A
3 m
E
D
x
2 m
C
B
4 m

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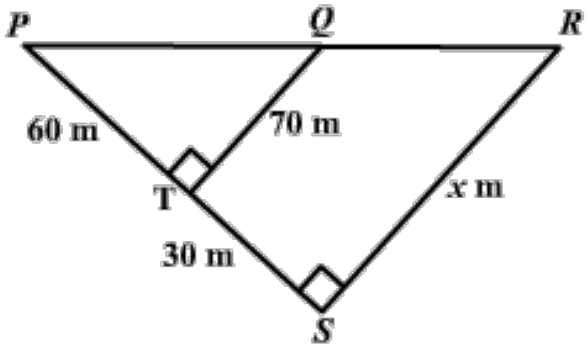
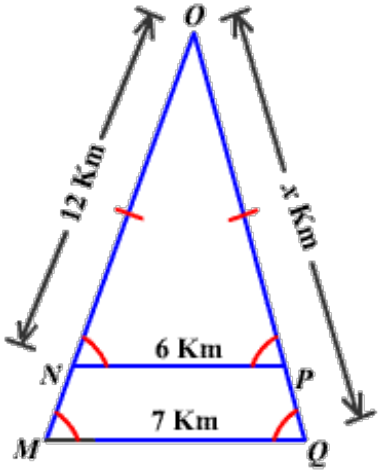
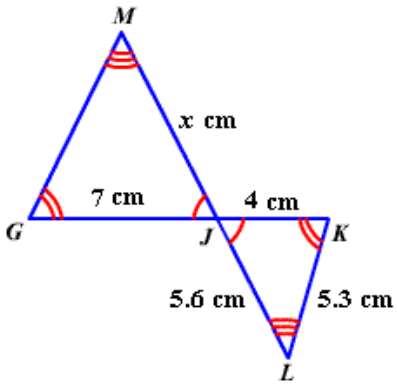
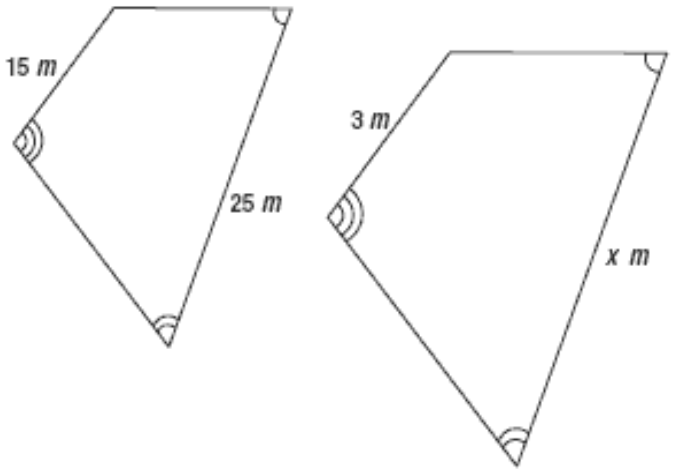
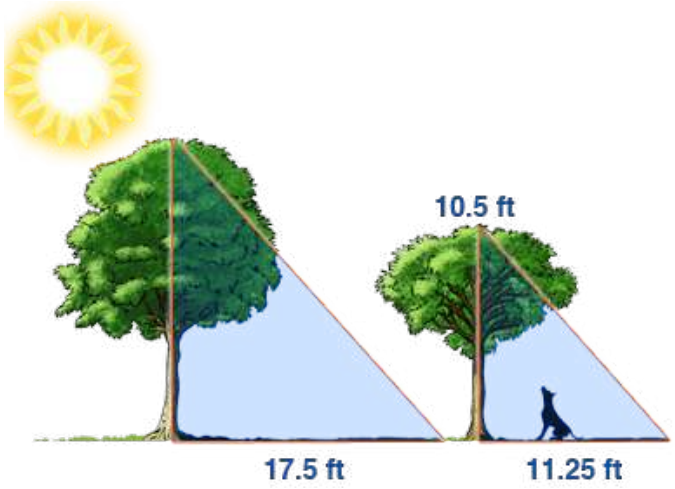
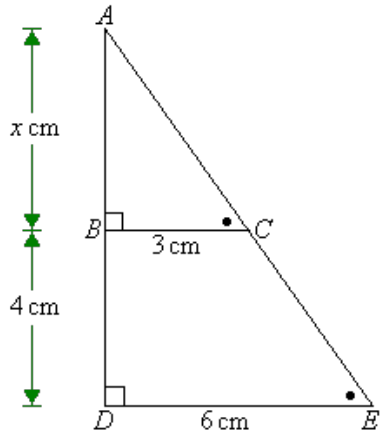





M
x cm
7 cm
4 cm
G
J
K
5.6 cm
5.3 cm
L


15 m
25 m
3 m
x m


10.5 ft
17.5 ft
11.25 ft


A
x cm
B
C
3 cm
4 cm
D
6 cm
E

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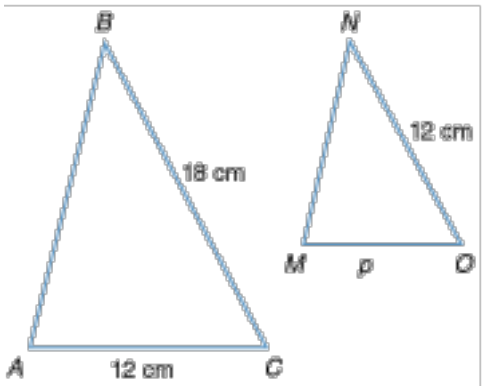
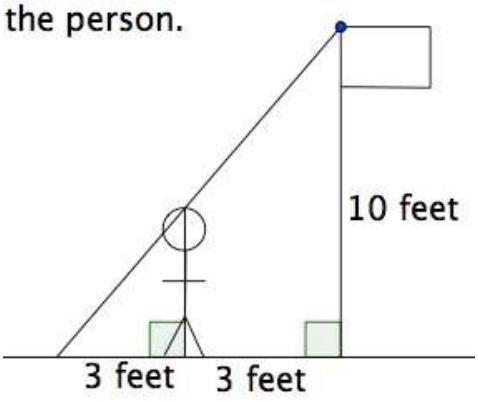
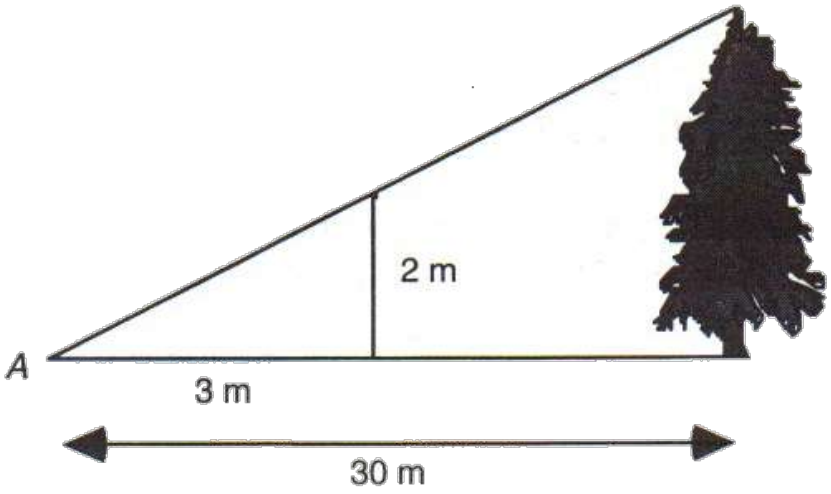


Use similar triangles to find the height of the person.





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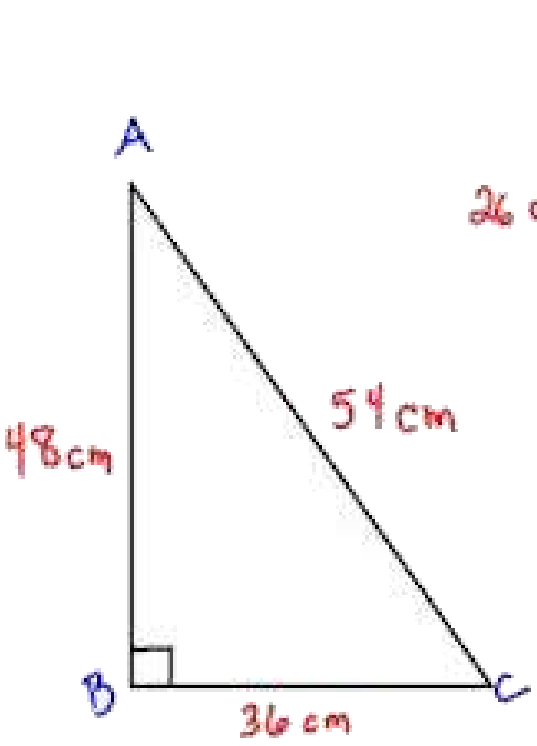
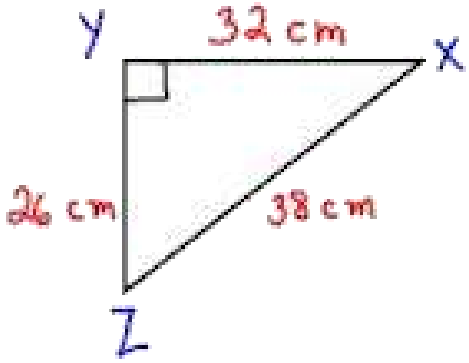
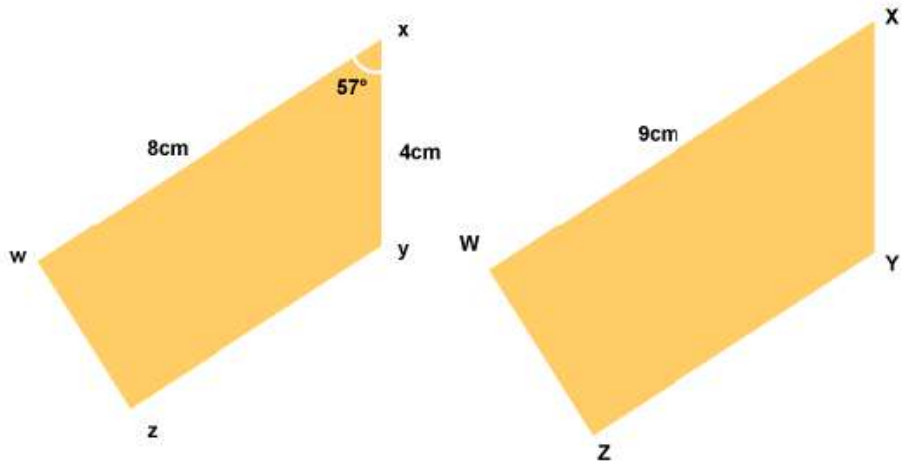




Are these two triangles similar? Explain your reasoning.

What is the length of side $\overline{XY}$?



Answer each question and round your answer to the nearest whole number.

1) A woman that is 6 ft tall casts a shadow that is 18 ft long. Find the height of a car that casts a 12 ft shadow.

2) A 6 ft tall petrified stump standing next to a car casts a 12 ft shadow. If the car casts a shadow that is 6 ft long then how tall is it?

3) A 6 ft tall petrified stump standing next to an adult elephant casts a 3 ft shadow. If the adult elephant casts a shadow that is 5 ft long then how tall is it?

4) A 5 ft tall petrified stump standing next to a statue casts a 4 ft shadow. If the statue is 15 ft tall then how long is its shadow?

5) A 15 ft tall statue standing next to a globe casts a 20 ft shadow. If the globe is 3 ft tall then how long is its shadow?

6) A 18 ft tall adult giraffe standing next to a statue casts a 9 ft shadow. If the statue is 10 ft tall then how long is its shadow?

Solve applied problems using the attributes of similar triangles.
Show that two triangles are similar using AA, SSS, and SAS Theorems.
Use the triangle proportionality and mid-segment theorem.
Solve problems using ratio and proportions.

Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective Content Objective

Week 4, Lesson 3

1. Warm-up
2. Notes
3. ICA
4. Extra Practice

Language Objectives

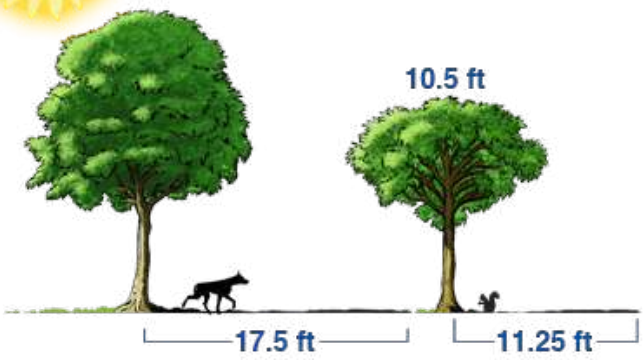
I will discuss with the members of my group the solutions to similar figure application problems.

I will explain the steps required to solve similar figure problems.

I will write a summary for solving similar figure problems.

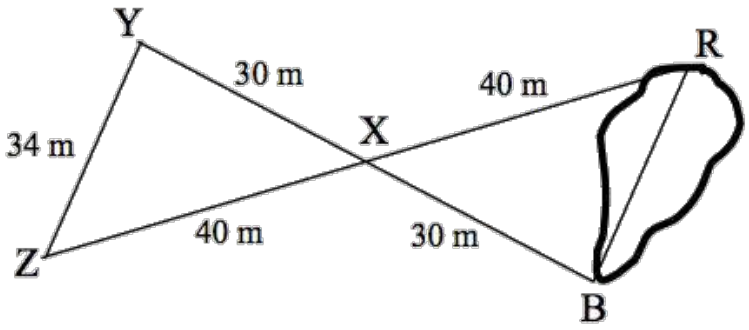
Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm-up: Find the height of the taller tree.



A. Draw similar figures
B. Place data in a matrix
C. Solve

A Forest Ranger needs to measure the distance across a pond from point R to point B. She knows the measures between the points shown below.

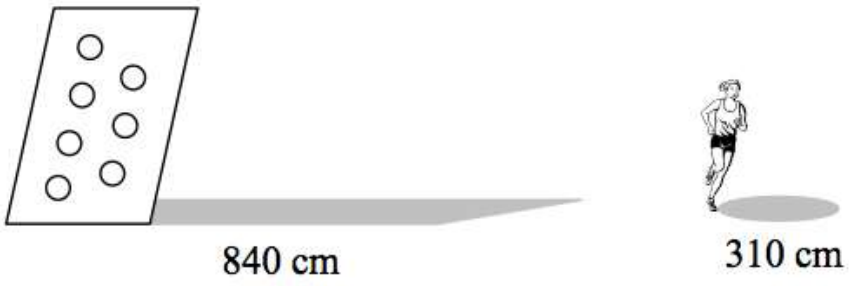


Note: The figure is not drawn to scale.

Describe how the measurements shown enable her to determine the distance across the pond.
What is the distance from R to B? Use mathematics to justify your answer.

A. Draw similar figures
B. Place data in a matrix
C. Solve

Marni wants to know the height of the climbing wall in the park. As she is standing next to the wall, Marni measures her shadow and the wall's shadow.



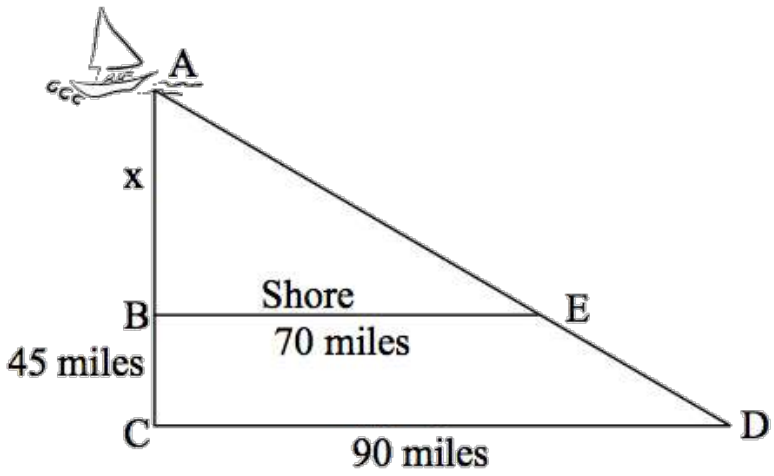
Note: The figure is not drawn to scale.

Determine the height of the wall if Marni is 170 cm tall.

A. Draw similar figures
B. Place data in a matrix
C. Solve

Captain Cook needs to know the distance from his ship to the shore.

He knows the measures given and that BE || CD .

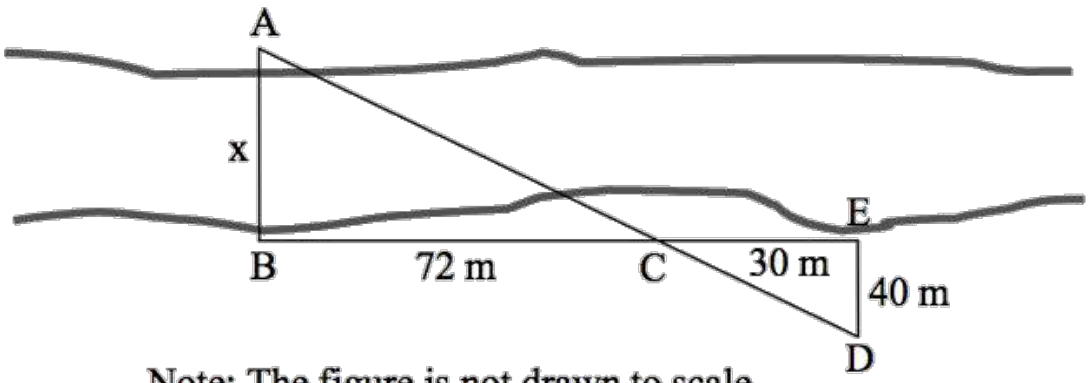


Note: The figure is not drawn to scale.

What is the distance (x) from his ship to the shore?
Use mathematics to explain how you determined your answer.
Use words, symbols, or both in your explanation.

A. Draw similar figures
B. Place data in a matrix
C. Solve

In the military it is often necessary to build temporary bridges across a river. To do this, it is necessary to determine the distance across the river. Sighting an object across the river, the engineer will set up right triangles to measure the distance across the river indirectly.

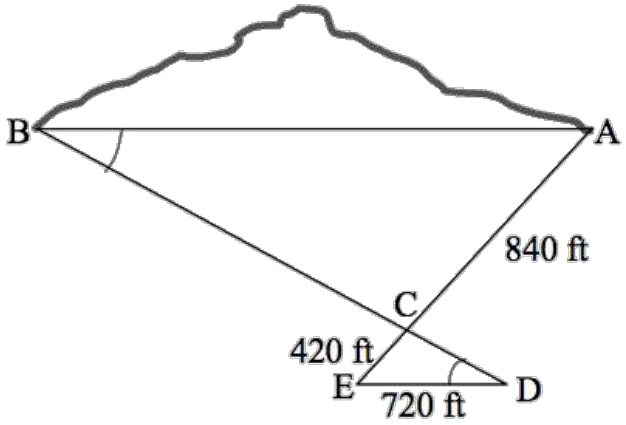


Note: The figure is not drawn to scale.

Using the diagram above, what is the length (x) of the bridge? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

A. Draw similar figures
B. Place data in a matrix
C. Solve

A surveyor needs to determine the distance across the base (AB) of a mountain. This surveyor can directly measure the lengths given below.



Note: The figure is not drawn to scale.

Is ΔEDC similar to ΔABC? Use mathematics to justify your answer. What is the measure of the base (AB) of the mountain?

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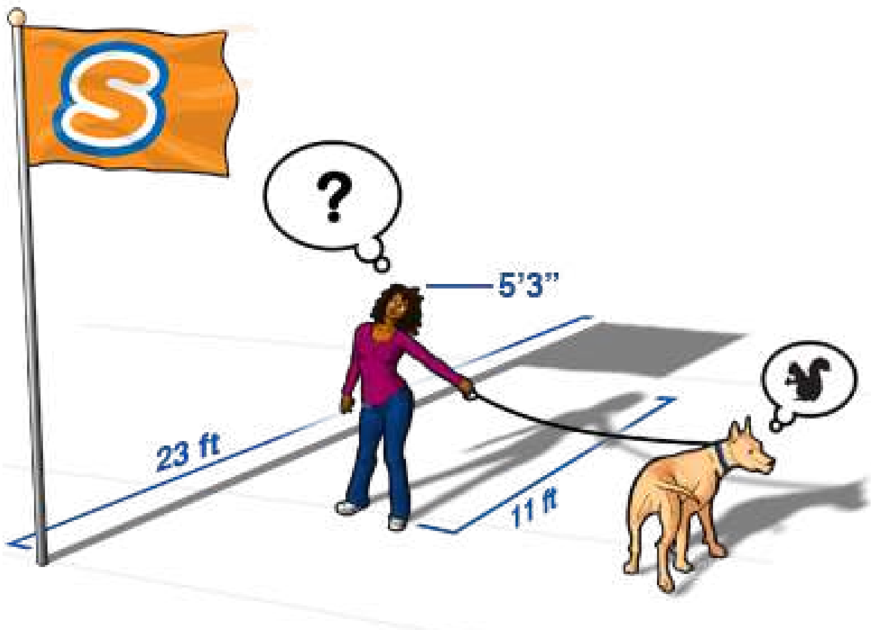
Calculate the height of the flag pole.



Answer the following. Solve by writing and solving a proportion.

A. Draw a picture
B. Place data in a matrix
C. Solve

1. A man 6 feet tall casts a shadow that is 11 feet long. A building casts a shadow of 139 feet long. What is the height of the building?

2. A person 5 feet tall casts a shadow that is 10 feet long. A tree casts a shadow that is 116 feet long. How tall is the tree?

3. A sign is 8 feet high and casts a 5-foot shadow while a nearby flagpole casts a 20-foot shadow. How high is the flagpole?

4. The shadow of a 4-foot pole is 6 feet long at the same time the shadow of a tower is 52.5 feet long. How tall is the tower?

5. Ryan is 5 feet tall. His shadow is 9 feet long and the shadow of a building is 36 feet long. How tall is the building?

Solve applied problems using the attributes of similar triangles.
Show that two triangles are similar using AA, SSS, and SAS Theorems.
Use the triangle proportionality and mid-segment theorem.
Solve problems using ratio and proportions.

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Week 4, Lesson 4

1. Warm-up
2. Notes
3. ICA
4. Extra Practice

Language Objectives

I will discuss with the members of my group the solutions to similar figure application problems.

I will explain the steps required to solve similar figure problems.

I will write a summary for solving similar figure problems.

Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm-up: Answer the following questions.

A. Draw a picture
B. Place data in a matrix
C. Solve

A 6 ft tall tent standing next to a cardboard box casts a 9 ft shadow. If the cardboard box casts a shadow that is 6 ft long then how tall is it?

A. Draw a picture
B. Place data in a matrix
C. Solve

A telephone booth that is 8 ft tall casts a shadow that is 4 ft long. Find the height of a lawn ornament that casts a 2 ft shadow.

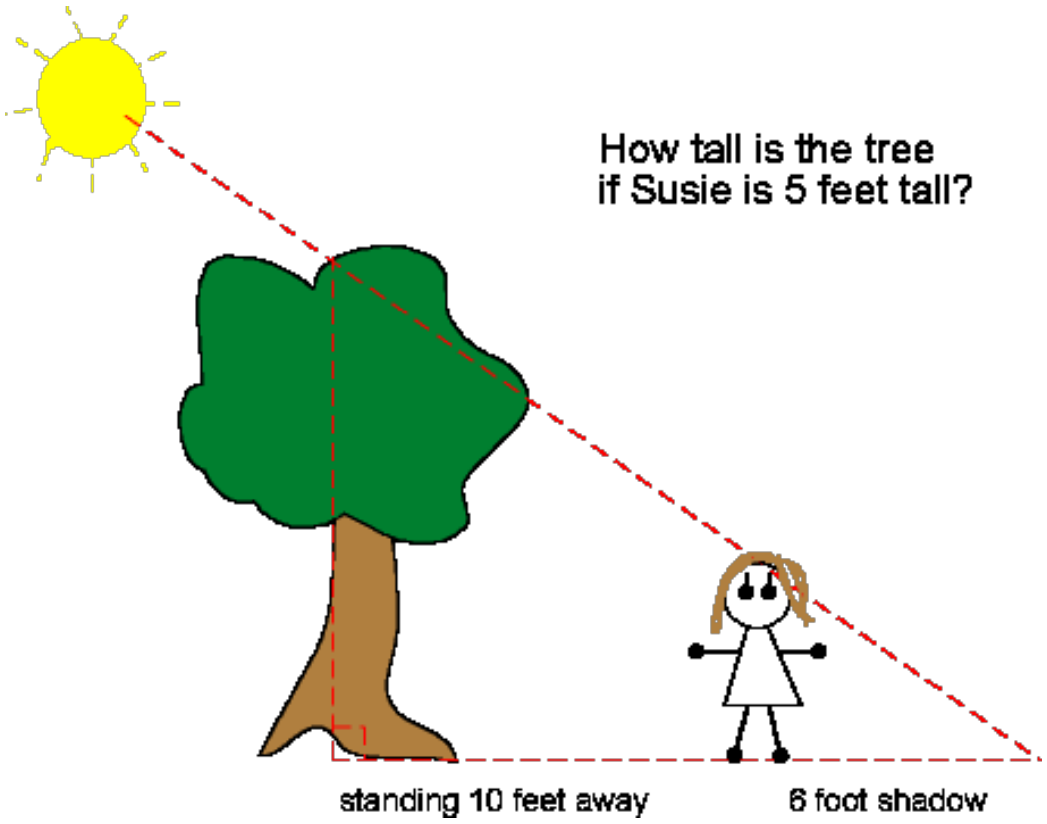
A. Draw a picture
B. Place data in a matrix
C. Solve

A 6.5 ft tall car standing next to an adult elephant casts a 33.2 ft shadow. If the adult elephant casts a shadow that is 51.5 ft long then how tall is it?

A. Draw a picture
B. Place data in a matrix
C. Solve

If a 42.9 ft tall flagpole casts a 253.1 ft long shadow then how long is the shadow that a 6.2 ft tall woman casts?

Draw the Similar figures.



Answer each question and round your answer to the nearest whole number.

1) A 4 ft tall baby elephant standing next to a man casts a 6 ft shadow. If the man casts a shadow that is 9 ft long then how tall is he?

2) A 6 ft tall baby giraffe standing next to an adult elephant casts a 15 ft shadow. If the adult elephant casts a shadow that is 20 ft long then how tall is it?

3) If a 14 ft tall adult giraffe casts a 7 ft long shadow then how tall is a cardboard box that casts a 4 ft shadow?

4) A 8 ft tall tent standing next to a man casts a 16 ft shadow. If the man is 6 ft tall then how long is his shadow?

8) If a 6 ft tall baby giraffe casts a 4 ft long shadow then how tall is an adult giraffe that casts a 10ft shadow?

6) If a 8 ft tall telephone booth casts a 14 ft long shadow then how long is the shadow that a 4 ft tall petrified stump casts?