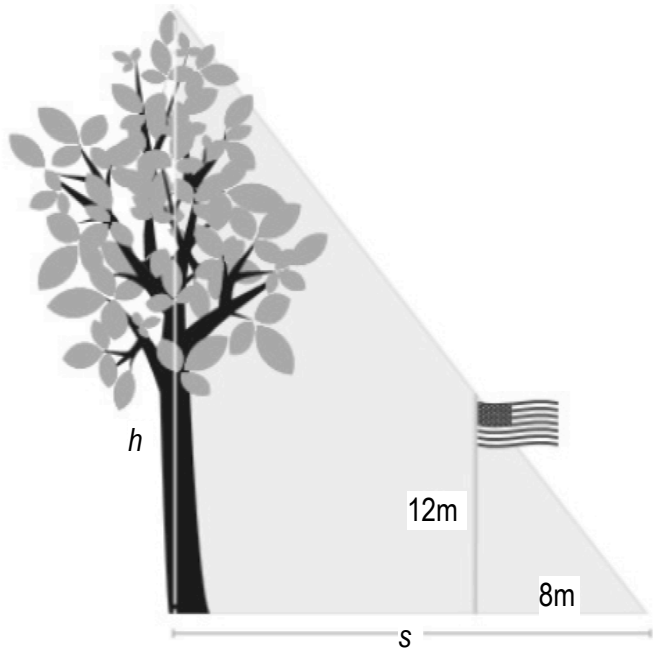


Name \_\_\_\_\_ Per \_\_\_\_\_

LO: I can use similar triangles to solve real world problems.

 **DO NOW** On the back of this packet (1) **Similarity: Applications -- ratios between similar triangles**

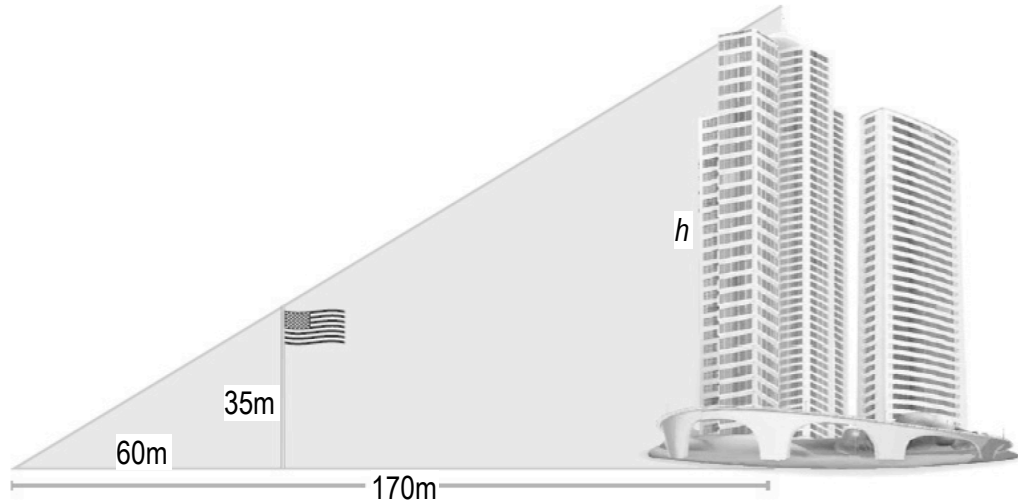
calculator

 (a) At a certain time of day, a 12 meter flagpole casts an 8m shadow. Write an equation that would allow you to find the height,  $h$ , of the tree that uses the length,  $s$ , of the tree's shadow.

(2)  
calculator

**Similarity: Applications – ratios between and within similar triangles**

In the diagram below, a large flagpole stands outside of an office building. Marquis realizes that when he looks up from the ground, 60m away from the flagpole, that the top of the flagpole and the top of the building line up. If the flagpole is 35m tall, and Marquis is 170m from the building, how tall is the building?



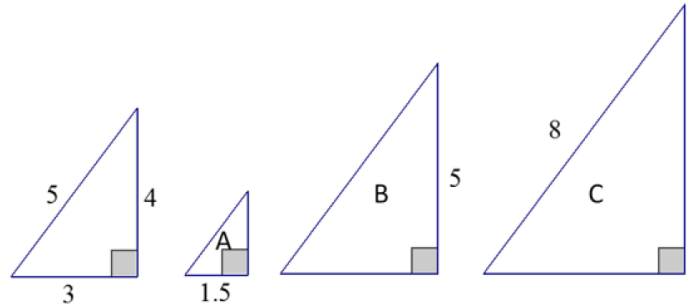
- (a) Are the triangles in the diagram similar? Explain.
- (b) Determine the height of the building using what you know about scale factors.
- (c) Determine the height of the building using ratios between similar figures
- (d) Determine the height of the building using ratios within similar figures.

(3) **Similarity: Ratios between and within similar figures.**

highlighters &amp; calculators

The following right triangles are similar. We will determine the unknown side lengths by using ratios within the first triangle. For each of the triangles below we define the base as the horizontal length of the triangle and the height as the vertical length.

(a) Write and find the value of the ratio that compares the height to the hypotenuse of the leftmost triangle.



(b) Write and find the value of the ratio that compares the base to the hypotenuse of the leftmost triangle.

(c) Write and find the value of the ratio that compares the height to the base of the leftmost triangle.

(d) Use the triangle with the lengths 3-4-5 and triangle A to answer the following questions.

i. Which ratio can be used to determine the height of triangle A?

ii. Which ratio can be used to determine the hypotenuse of triangle A?

iii. Determine the unknown lengths of triangle A.

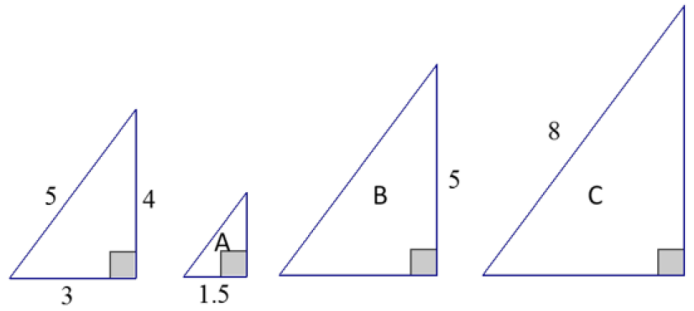
(3)  
highlighter  
&  
calculators

**Similarity: Ratios between and within similar figures.**

(e) Use the triangle with lengths 3-4-5 and triangle *B* to answer the following questions.

i. Which ratio can be used to determine the base of triangle *B*?

ii. Which ratio can be used to determine the hypotenuse of triangle *B*?



iii. Find the unknown lengths of triangle *B*.

(f) Use the triangle with lengths 3-4-5 and triangle *C* to answer the following questions.

i. Which ratio can be used to determine the height of triangle *C*?

ii. Which ratio can be used to determine the base of triangle *C*?

iii. Find the unknown lengths of triangle *C*?

(g) Explain the relationship of the ratio of the corresponding sides within a figure to the ratio of corresponding sides within a similar figure.

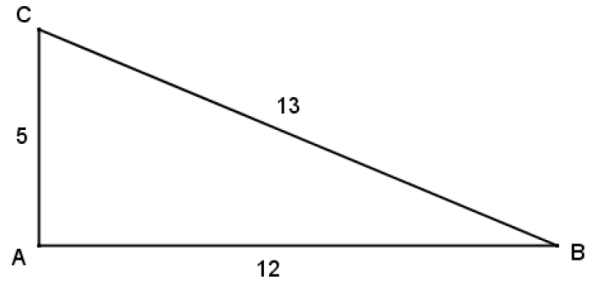
(h) How does the relationship you noted in part (g) allow you to determine the length of an unknown side of a triangle?

(4)  
highlighter  
&  
calculators

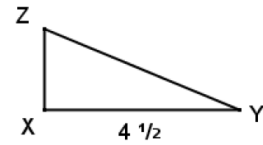
**Similarity: Using similar triangles to find unknown measures.**

Given  $\triangle ABC \sim \triangle XYZ$ , answer the following questions.

(a) Write and find the value of the ratio that compares the height  $\overline{AC}$  to the hypotenuse of  $\triangle ABC$ .



(b) Write and find the value of the ratio that compares the base of  $\overline{AB}$  to the hypotenuse of  $\triangle ABC$ .



(c) Write and find the value of the ratio that compares the height  $\overline{AC}$  to the base  $\overline{AB}$  of  $\triangle ABC$ .

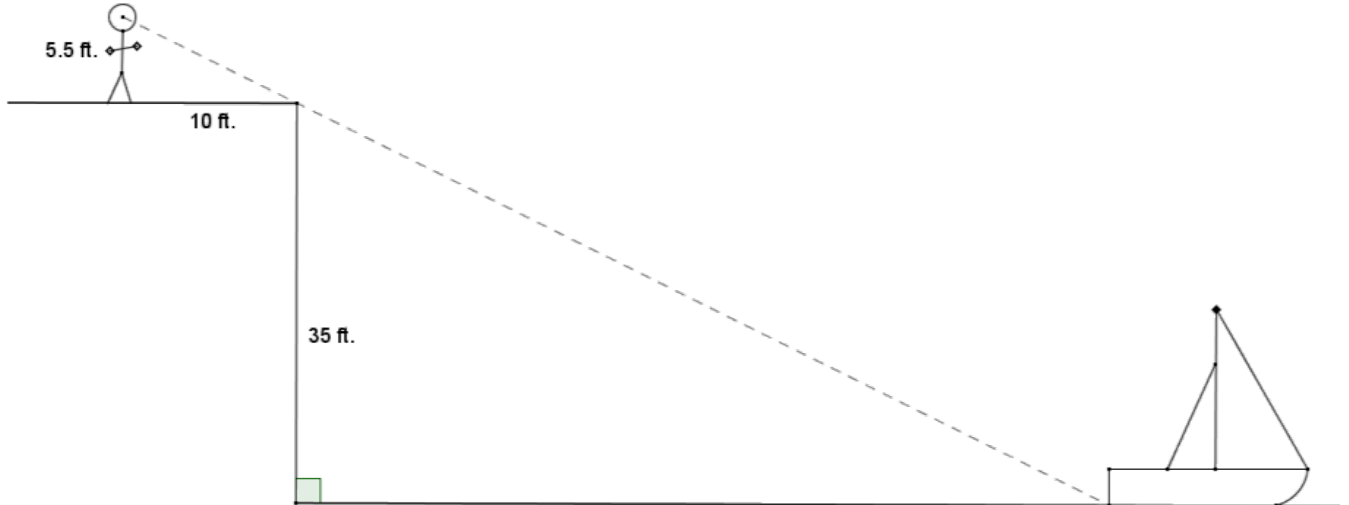
(d) Use within-figure ratios to find the corresponding height of  $\triangle XYZ$ .

(e) Use within-figure ratios to find the corresponding height of  $\triangle XYZ$ .

(5)  
highlighter  
&  
calculators

**Similarity: Using similar triangles to find unknown measures.**

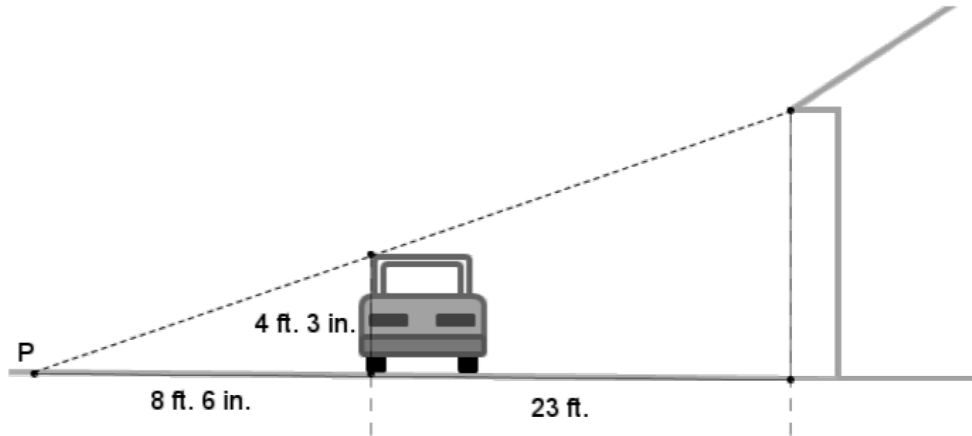
Catarina's boat has come untied and floated away on the lake. She is standing atop a cliff that is 35 feet above the water in a lake. If she stands 10 feet from the edge of the cliff, she can visually align the top of the cliff with the water at the back of her boat. Her eye level is  $5\frac{1}{2}$  feet above the ground. Approximately how far out from the cliff is Catarina's boat?



(6)  
highlighter  
&  
calculators

**Similarity: Using similar triangles to find unknown measures.**

Dennis needs to fix a leaky roof on his house but does not own a ladder. He thinks that a 25-foot ladder will be long enough to reach the roof, but he needs to be sure before he spends the money to buy one. He chooses a point  $P$  on the ground where he can visually align the roof of his car with the edge of the house roof. Help Dennis determine if a 25-foot ladder will be long enough for him to safely reach his roof.



(7)  
compass,  
straightedge

**Exit Ticket**

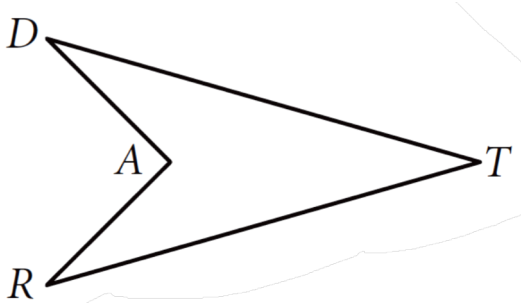
The Exit Ticket is on the last page of this packet. Do it, tear it off and turn it in.

(8) **Homework:**

compass,  
straightedge

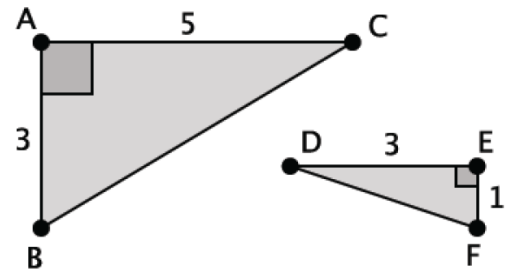
(1) Given:  $\overline{DT} \cong \overline{RT}$ ,  $\overline{DA} \cong \overline{RA}$

Prove:  $\angle D \cong \angle R$  (Hint: draw an auxiliary line to create triangles to prove congruent first.)



(2)

Are the triangles shown below similar? Explain. If the triangles are similar, write the similarity statement.

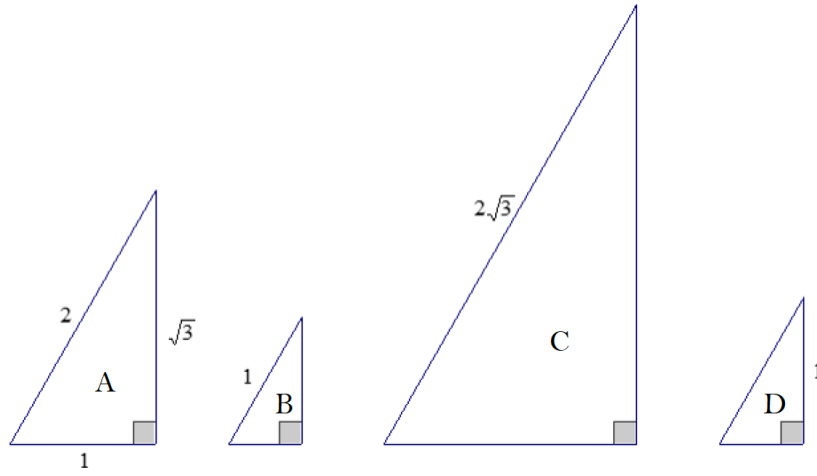




(8) **Homework:**

compass,  
straightedge

(3) Right triangles  $A$ ,  $B$ ,  $C$ , and  $D$  are similar. Determine the unknown side lengths of each triangle by using ratios of side lengths within triangle  $A$ .

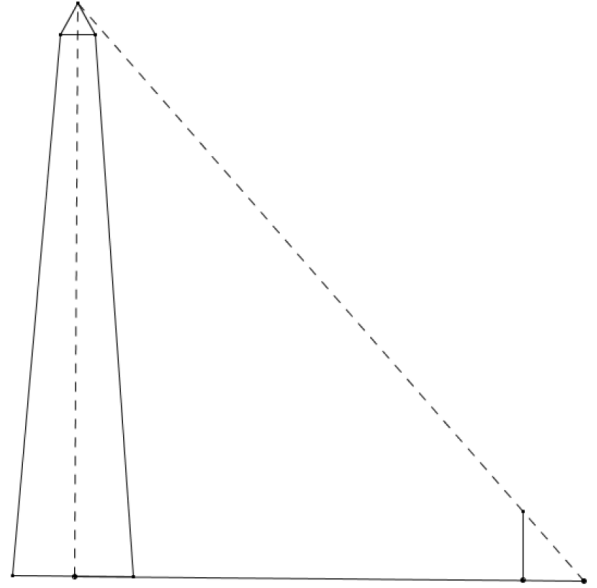


- Write and find the value of the ratio that compares the height to the hypotenuse of triangle  $A$ .
- Write and find the value of the ratio that compares the base to the hypotenuse of triangle  $A$ .
- Write and find the value of the ratio that compares the height to the base of triangle  $A$ .
- Which ratio can be used to determine the height of triangle  $B$ ? Find the height of triangle  $B$ .
- Which ratio can be used to determine the base of triangle  $B$ ? Find the base of triangle  $B$ .
- Find the unknown lengths of triangle  $C$ .
- Find the unknown lengths of triangle  $D$ .

(5) **Homework:**

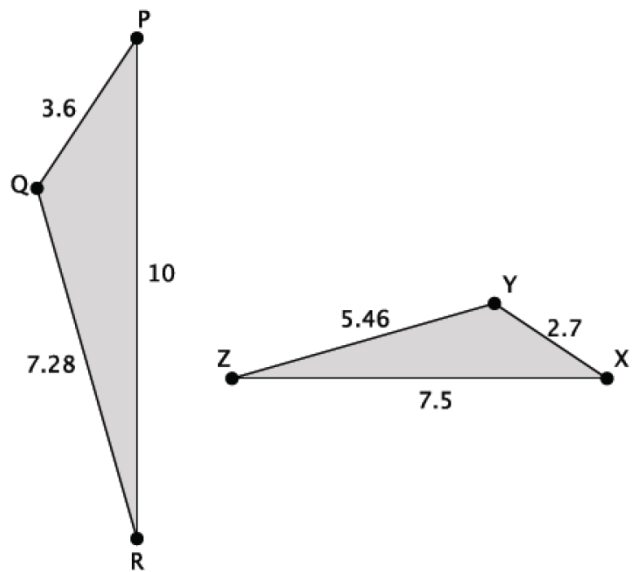
compass,  
straightedge

- (4) Brian is photographing the Washington Monument and wonders how tall the monument is. Brian places his 5 ft. camera tripod approximately 100 yd. from the base of the monument. Lying on the ground, he visually aligns the top of his tripod with the top of the monument and marks his location on the ground approximately 2 ft. 9 in. from the center of his tripod. Use Brian's measurements to approximate the height of the Washington Monument.



(5)

Are the triangles shown below similar? Explain. If the triangles are similar, write the similarity statement.



**Exit Ticket**    **Name** \_\_\_\_\_ **Date** \_\_\_\_\_ **Per** \_\_\_\_\_    **6.5R**

(1) The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

Malik is standing outside in the sun. Malik is 72" tall and his shadow is 60" long. Jeremy is standing near Malik. Jeremy's shadow is 56" long. Draw a diagram to represent this situation and use it to calculate Jeremy's height.

- (1) Malik is standing outside in the sun and his shadow is on the ground. Make a sketch of this situation including the sun, Malik, and his shadow.

- (2) Dog owners or dog snacks? How is this photo possible? (No photoshop used!)

