Lesson 2.6.1: Incredibly Useful Ratios

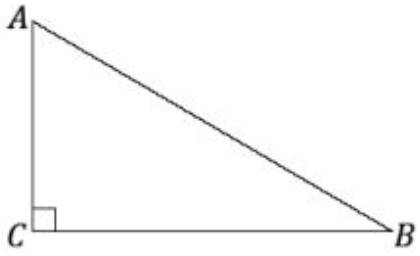
Targets:

1. I can identify which sides of a triangle are "opposite," "adjacent," and "hypotenuse" given one of the acute angles as a reference.
2. I can explain why the ratio of adjacent/hypotenuse and opposite/hypotenuse are constant for a given acute angle.

Warm Up

Use the right triangle $\triangle ABC$ to answer each part.

- Name the side of the triangle opposite $\angle A$.
- Name the side of the triangle opposite $\angle B$.
- Name the side of the triangle opposite $\angle C$.



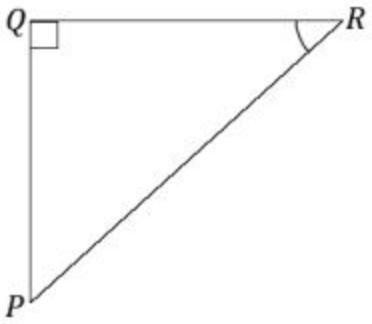
Practice 1

Label the appropriate sides as adjacent, opposite, and hypotenuse, with respect to the marked acute angle.

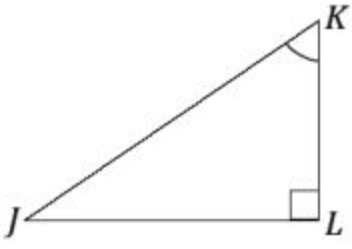
Practice 2

Label the appropriate sides as adjacent, opposite, and hypotenuse, with respect to the marked acute angle.

a.)



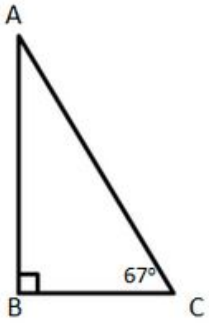
b.)

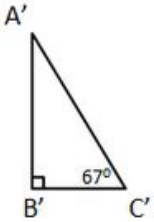


Explore Activity

Exploring Ratios

a.) Determine whether Triangle ABC and Triangle A′B′C′ are similar. How do you know?

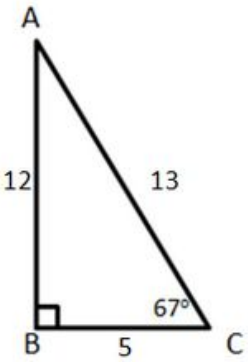


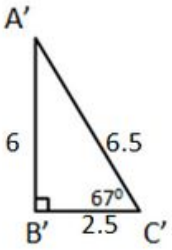


b.) Now that we have the side lengths, find the ratio of $\frac{opp}{hyp}$ for angle C.

c.) Find the ratio of $\frac{opp}{hyp}$ for angle C′.

d.) Find the ratio of $\frac{adj}{hyp}$ for angle C and C′.





e.) Is there a relationship between the ratios between triangles? If so, what is the relationship?

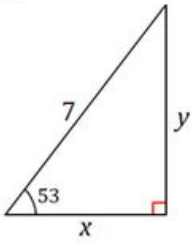
Practice 3

Use this table of ratios to help you solve parts a – c.

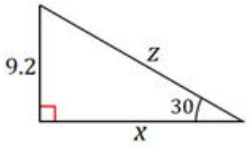
For each question, approximate the unknown lengths to one decimal place. Refer to this given chart to help you. Set up and label the appropriate length ratios, using the terms *opp*, *adj*, and *hyp* in the set up of each ratio.

Angle	$\frac{opp}{hyp}$ Ratio	$\frac{adj}{hyp}$ Ratio
67	.92	.38
53	.8	.6
41	.66	.75
30	.5	.87
28	.47	.88

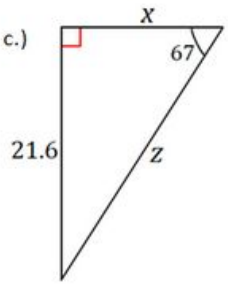
a.)



b.)



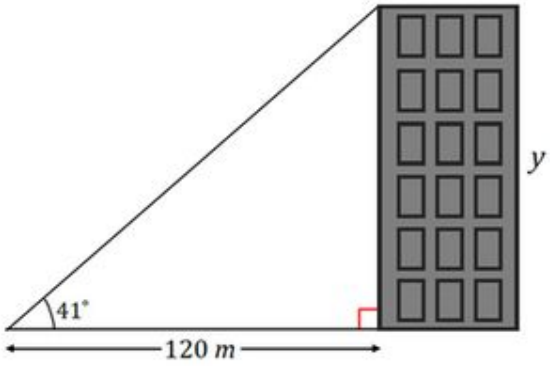
c.)



Practice 4

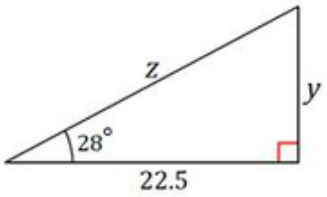
From a point 120 m away from a building, Serena measures the angle between the ground and the top of a building and finds it measures 41°.

What is the height of the building? Round to the nearest meter.



Exit Ticket

1. Use the chart from Practice 3 to approximate the unknown lengths y and z to one decimal place.



2. Why can we use the chart from Practice 3 to approximate the unknown lengths?