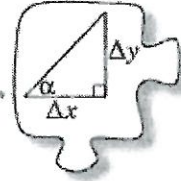


4.1.2 How important is the angle?

.....
 Connecting Slope Ratios to Specific Angles



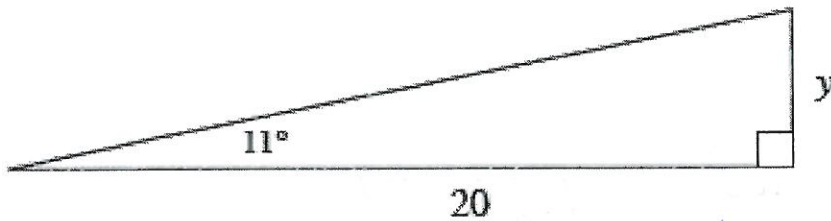
In Lesson 4.1.1, you started **trigonometry**, the study of the measures of triangles. As you continue to investigate right triangles with your team today, use the following questions to guide your discussion:

What do I know about this triangle?

How does this triangle relate to other triangles?

Which part is Δx ? Which part is Δy ?

4-12. What do you know about this triangle? To what other triangles does it relate? Use any information you have to solve for y .



For example,
 $\theta = 11^\circ$

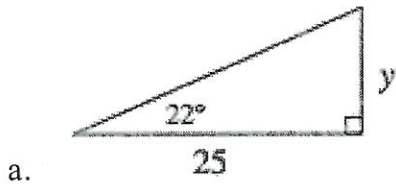
$$\frac{1}{5} = \frac{y}{20}$$

$$20 = 5y$$

$$\boxed{4 = y}$$

* $\theta = \text{theta}$
 \hookrightarrow A variable for an angle

4-13. For each triangle below, find the missing angle or side length. Use your work from Lesson 4.1.1 to help you.



$$\frac{2}{5} = \frac{y}{25}$$

$$\theta = 22^\circ$$

$$\frac{5y}{5} = \frac{50}{5}$$

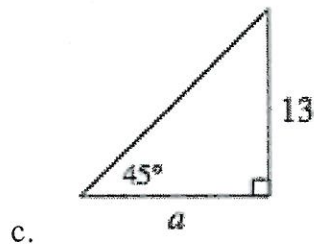
$$y = 10$$



$$\frac{1}{5} = \frac{100}{x}$$

$$500 = x$$

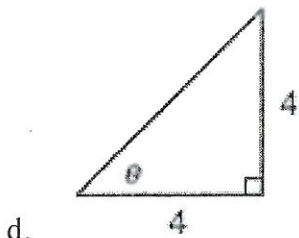
$$\theta = 11^\circ$$



$$\frac{1}{1} = \frac{13}{x}$$

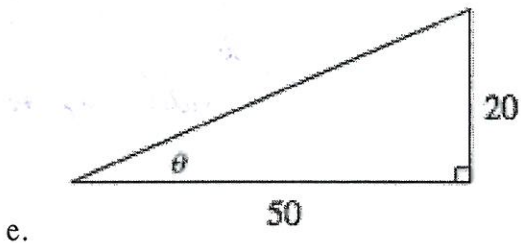
$$13 = x$$

$$\theta = 45^\circ$$

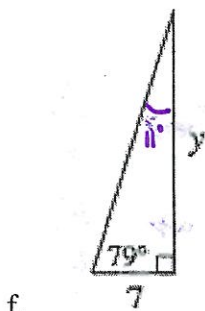


$$\frac{4}{4} = 1$$

$$\theta = 45^\circ$$



$$\frac{20}{50} = \frac{2}{5} \quad \theta = 22^\circ$$

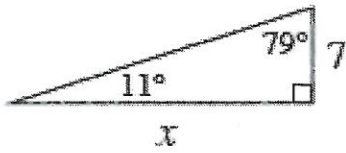


$$\theta = 11^\circ$$

$$\frac{1}{5} = \frac{7}{y}$$

$$y = 35$$

4-14. Sheila says the triangle in part (f) of problem 4-13 is the same as her drawing below.



I agree, she rotated it

Do you agree? Use tracing paper to convince you of your conclusion.

- a. Use what you know about the slope ratio of 11° to find the slope ratio for 79° .

11° and 79° are complementary
* add up to 90°

- b. What is the relationship of 11° and 79° ? Of their slope ratios?

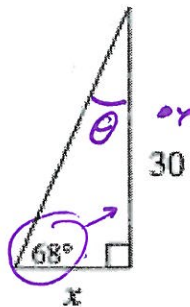
$$11^\circ \rightarrow \frac{1}{5}$$

$$79^\circ \rightarrow \frac{5}{1}$$

4-15. For what other angles can you find the slope ratios based on the work you did in Lesson 4.1.1?

For example, since you know the slope ratio for 22° , what other angle do you know the slope ratio for? Use tracing paper to find a slope ratio for the complement of each slope angle you know. Use tracing paper to help re-orient the triangle if necessary.

- a. Use this information to find x in the diagram below.



$$\theta = 22^\circ$$

$$22^\circ \rightarrow \frac{2}{5}$$

$$68^\circ \rightarrow \frac{5}{2}$$

$$\frac{5}{2} = \frac{30}{x}$$

$$\frac{60}{5} = \frac{5x}{5}$$

$$\boxed{x = 12}$$

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b. Write a conjecture about the relationship of the slope ratios for complementary angles. You may want to start with, "If one angle of a right triangle has the slope ratio $\frac{a}{b}$, then its complementary angle has a slope ratio of $\frac{b}{a}$."



4-16. BUILDING A TRIGONOMETRY TABLE

So far you have looked at several similar slope triangles and their corresponding slope ratios. These relationships will be very useful for finding missing side lengths or angle measures of right triangles for the rest of this chapter.

Before you forget this valuable information, organize information about the triangles and ratios you have discovered so far in the table on the Lesson 4.1.2 ("Trig Table Toolkit") Resource Page provided by your teacher. Keep it in a safe place for future reference. Include all of the angles you have studied up to this point. An example for 11° is filled in on the table to get you started.

