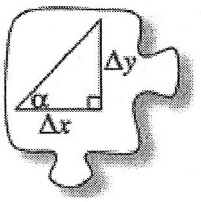
Name: Notes Period: Date:

4.1.3 What if the angle changes?



Expanding the Trig Table

In the last few lessons, you found the slope ratios for several angles. However, so far you are limited to using the slope angles that are currently in your Trig Table. How can you find the ratios for other angles? And how are the angles related to the ratio?

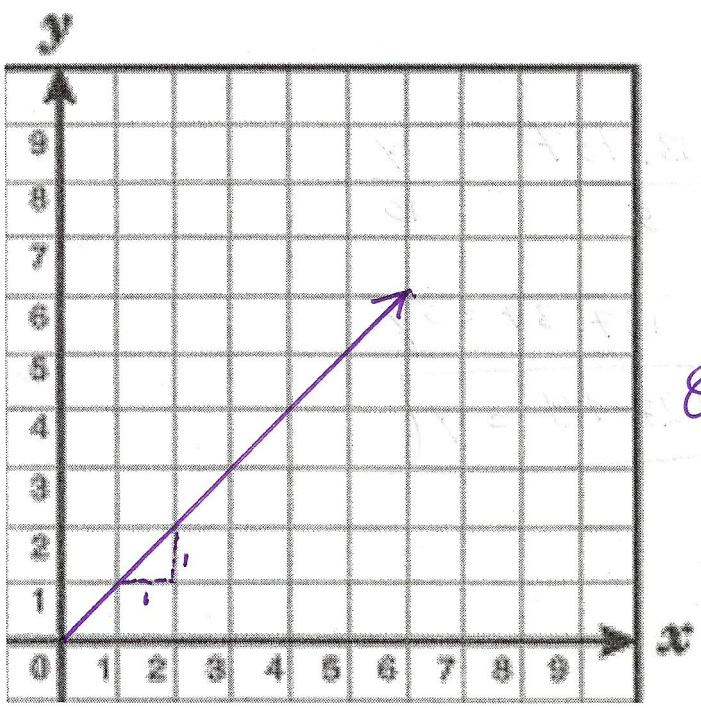
Today your goal is to determine ratios for more angles and to find patterns. As you work today, keep the following questions in mind:

What happens to the slope ratio when the angle increases? Decreases?

What happens to the slope ratio when the angle is 0°? 90°?

When is a slope ratio more than 1? When is it less than 1?

4-23. On your paper, draw a slope triangle with a slope angle of 45°.



$\theta = 45°$

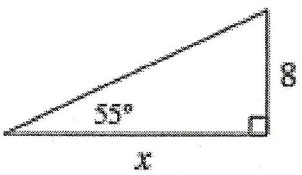
$\frac{1}{1} = 1$

Now visualize what would happen to the triangle if the slope angle increased to 55°. Which would be longer? Δy or Δx? Explain your reasoning.

Δy would increase

Name:_____ Period:_____ Date:_____

Using the Slope Ratios (Desmos) eTool (or the Lesson 4.1.3 Resource Page), create a triangle with a slope angle measuring 55°. Then use the resulting slope ratio to solve for x in the triangle at below. (Note: The triangle at right is not drawn to scale.)



$\theta = 55°$

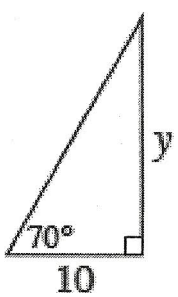
$\frac{10}{7} = \frac{8}{x}$

$56 = 10x$

$x = 5.6$

4-24. Copy each of the following triangles onto your paper. Decide whether or not the given measurements are possible. If the triangle is possible, find the value of x, y, or θ. Your teacher will provide a Lesson 4.1.3 Resource Page with the needed ratios. Round angle measures to the nearest degree. If a triangle's indicated measurement is not possible, explain why.

a.



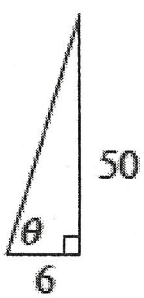
$\theta = 70°$

$\frac{13.737}{5} = \frac{y}{10}$

$137.37 = 5y$

$27.474 = y$

b.

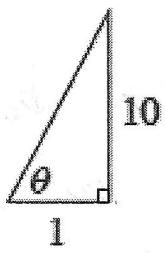


$\theta = ?$

$\frac{50}{6} \Rightarrow 83° = \theta$

Name:_____ Period:_____ Date:_____

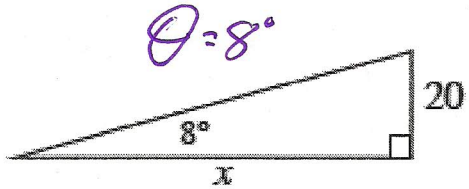
c.



$\theta = ?$

$\frac{10}{1} = 10 \Rightarrow$ **$84° = \theta$**

d.



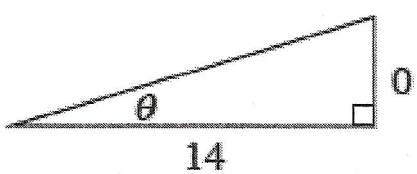
$\theta = 8°$

$\frac{26}{185} = \frac{20}{x}$

$26x = 3700$

$x = 142.31$

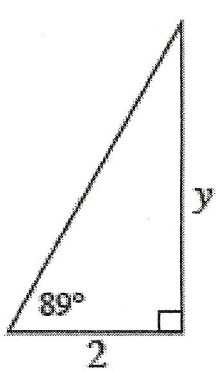
e.



$\theta = ?$

$\frac{0}{14} = 0 \Rightarrow$ **$0° = \theta$**

f.



$\theta = 89°$

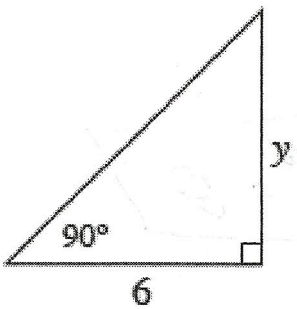
$\frac{5729}{100} = \frac{y}{2}$

$100y = 11458$

$y = 114.58$

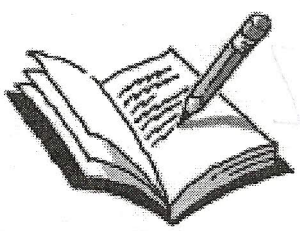
Name:_____ Period:_____ Date:_____

g.



Does not exist because two 90° add to 180° which is the total sum of a △. However, 2 ∠s do not make up a △.

4-25. If you have not already, add these new slope ratios with their corresponding angles to your Trig Table Toolkit. Be sure to draw and label the triangle for each new angle. Summarize your findings—which slope triangles did not work? Do you see any patterns?



4-26. LEARNING LOG

What statements can you make about the connections between slope angle and slope ratio? In your Learning Log, write down all of your observations from this lesson. Be sure to answer the questions given at the beginning of the lesson (reprinted below). Title this entry, "Slope Angles and Slope Ratios" and include today's date.

What happens to the slope ratio when the angle increases? Decreases?

What happens to the slope ratio when the angle is 0°? 90°?

When is a slope ratio more than 1? When is it less than 1?