

October 9

Write each of the following trig functions in terms of $\sin\theta$ and $\cos\theta$.

$$\csc\theta = \frac{1}{\sin\theta}$$

$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

$$\sec\theta = \frac{1}{\cos\theta}$$

$$\cot\theta = \frac{1}{\tan\theta} = \frac{\cos\theta}{\sin\theta}$$

$$\tan\theta = \frac{\text{opp}}{\text{adj}}$$

$$\cos\theta = \frac{\text{adj}}{\text{hyp}}$$

$$\sin\theta = \frac{\text{opp}}{\text{hyp}}$$

$$\frac{\sin\theta}{\cos\theta} = \frac{\frac{\text{opp}}{\text{hyp}}}{\frac{\text{adj}}{\text{hyp}}} = \frac{\text{opp} \cdot \text{hyp}}{\text{hyp} \cdot \text{adj}} = \frac{\text{opp}}{\text{adj}} = \tan\theta$$

$$\frac{1}{\frac{\sin\theta}{\cos\theta}} = 1 \cdot \frac{\cos\theta}{\sin\theta}$$

October 9

Students will verbally explain how to graph all six trig functions

(using the words:
zero, asymptote, undefined...)





Graphs of the OTHER Trig Functions Student Activity

Name _____
Class _____

Open the TI-Nspire document
Graphs_of_the_OTHER_Trig_Functions.tns.

You probably know a lot about sine, cosine and tangent, but you might not know as much about the other trigonometric functions, cotangent, secant, and cosecant. In this activity, you will explore those functions, learn what their graphs look like, and why they look the way they do.



Move to page 2.2

1. a. Recall that we can write the trig functions in terms of the sine and cosine functions.
What is the secant function in terms of the sine and cosine functions?

- b. Click to move the point around the circle. What does the bold line segment length represent? How is it determined?

- c. For what values of θ is the secant 0? Undefined? Why?

$$90^\circ = \frac{\pi}{2}$$

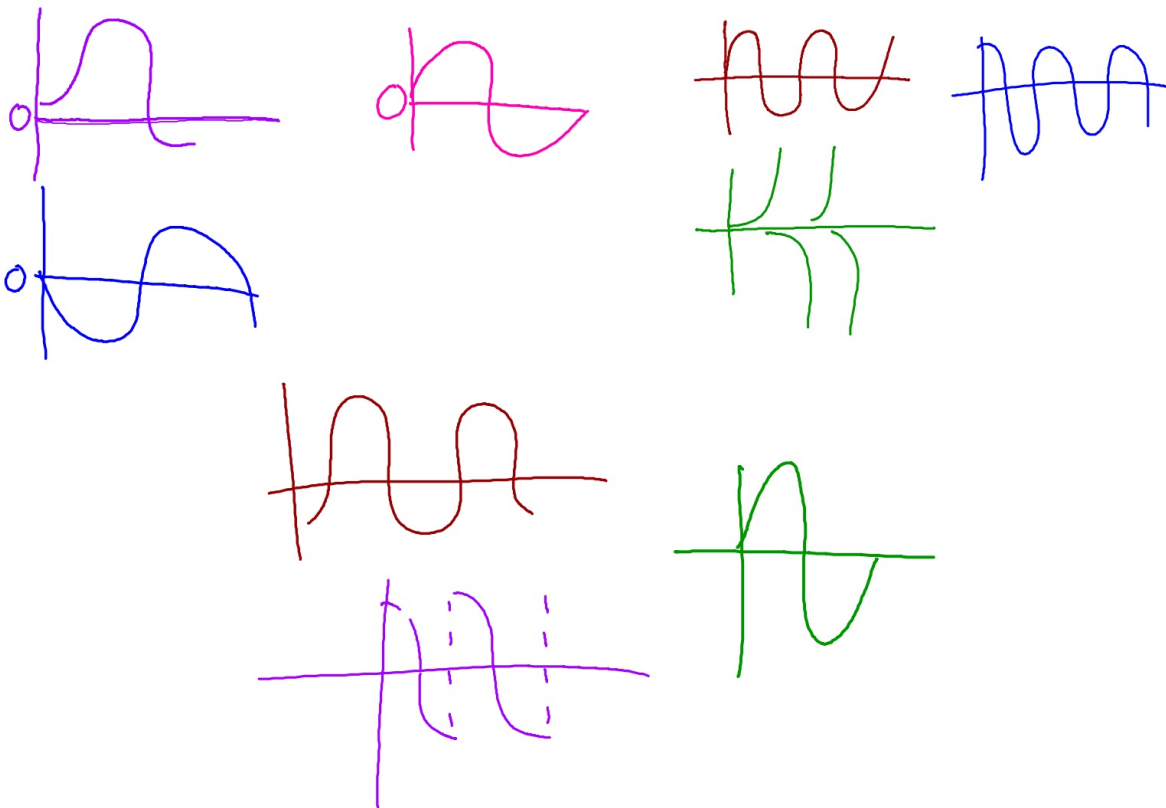
$$\cos(90) = 0$$

$$\sec(90) = \frac{1}{\cos(90)} = \frac{1}{0}$$

- d. Describe or sketch what you think the graph of the secant function might look like.
Explain your thinking.

↑
you can't
divide by
zero

Predict what the graph of $\sec \theta$ looks like:





Move to page 3.2

5. The left hand side of the screen shows the unit circle from Page 2.2, and the right side shows the graph of the secant function.
- a. How does the graph of the secant function compare to your description in question 3? If your prediction was incorrect, what do you think was your mistake?

- b. What happens as you click the arrow to change the value of θ ? Why does the graph "jump" from one piece to another? Why doesn't the graph ever cross the x-axis?

$$\sec \theta = 0 \quad \cos \theta \cdot \frac{1}{\cos \theta} = 0 \cdot \cos \theta$$

no solutions $1 \neq 0$

Move to page 4.2

6. a. How can you write the cosecant function in terms of the sine and cosine functions?

- b. Click to move the point around the circle. What does the bold line segment length represent? How is it determined?

- c. For what values of θ is the cosecant undefined? Why?

undef when $\theta = 0$ and 180°

- d. Describe or sketch what you think the graph of the cosecant function might look like. Explain your thinking.



Move to page 5.2

7. How does the graph of the cosecant function compare to your description in question 5? Explain.

8. Choose one of the ^{two} ~~three~~ trig functions from this activity. How could you use the graphs of sine and cosine to graph that function? Explain.

