

Precalculus Learning Goals - Week 8

This week we're going to continue our section on **Trigonometry**.

The general goals for the section **Trigonometry** are as follows. At the end of this section, students should be able to:

- *Transition between interpretations of trig functions on triangles, the unit circle, and as graphs.*
- *Compute all trig and inverse trig functions for common values.*
- *Define inverse trig functions and explain their domain and range.*
- *Use trig functions to solve for missing quantities involving triangles and model periodic motion.*
- *Use trigonometric identities to simplify and rewrite expressions.*

More specifically, at the end of this week you should be able to:

- State the domain and range of trig functions.
- Graph trig functions, including with shifts and scaling.
- Define *period*, *amplitude*, and *periodic function*.
- Use trig functions to model periodic behavior.
- Relate a periodic graph to a real-world situation.

Sample Problems. Here are some sample problems, of the type that you would do to demonstrate that you've learned the material. These are not the only types of problems you may see – they're just a sample.

- Sketch a graph of the function $f(t) = 3 \cos(2t - \frac{\pi}{2})$. What is the period of this function?
- What is the domain of the function $f(x) = \cot x$?
- At the CT State Fair, there is a Ferris wheel that has a radius of 30 feet. The center of the wheel sits 40 feet off the ground. Find a function that represents the height of one car on the Ferris wheel above the ground as a function of the angle that car makes with a horizontal line passing through the center of the wheel. If the wheel takes 2 minutes to make one rotation, find a function giving the height of the car above the ground as a function of time, where time $t = 0$ represents the point in time when the car is closest to the ground.
- What is the period of the function $\tan t$? Bonus: what is the period of the function $\sin t + \cos t$?