Learning Journal Unit 7

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MATH 1201: College Algebra

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October 26, 2023

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1. **Reflect on the concepts of trigonometry. What concepts (only the names) did you need to accommodate the concepts of trigonometry in your mind?**

   To better understand the concept of trigonometry, I think of a right-angle triangle with two acute interior angles. The ratio of the sides defines the three basic trigonometric ratios, that is, sine, cosine, and tangent.

2. **What are the simplest trigonometry concepts you can imagine?**

$$sin\theta = \frac{\text{Opposite}}{\text{Hypotenuse}} \qquad cos\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}} \qquad tan\theta = \frac{\text{Opposite}}{\text{Adjacent}}$$

3. **In your day to day, is there any occurring fact that can be interpreted as periodic patterns?**

   In our day-to-day lives, we often encounter numerous examples of periodic patterns. One classic example is the swinging motion of a child on a swing, which behaves like a simple pendulum. When a child is pushed to start swinging, they move back and forth repeatedly. This motion is analogous to a simple pendulum, which consists of a mass (the child in this case) attached to a string (the swing chains or ropes) that swings back and forth under the influence of gravity. Below are some of the characteristics showing the periodic nature of a child on a swing.

   - ✓ **Period:** The time it takes for the pendulum to complete one full swing from one side to the other and back to its initial position is known as the period (T).
   - ✓ **Amplitude:** The maximum angle the pendulum reaches from its vertical position is called the amplitude (θ). In the case of a swing, this is the maximum height the child reaches on either side.

- ✓ **Frequency:** The frequency (f) represents the number of swings or oscillations per unit of time, typically measured in Hertz (Hz).

The motion of a simple pendulum can be described mathematically using the equation:

$$T(l) = 2\pi\sqrt{\frac{L}{g}}$$

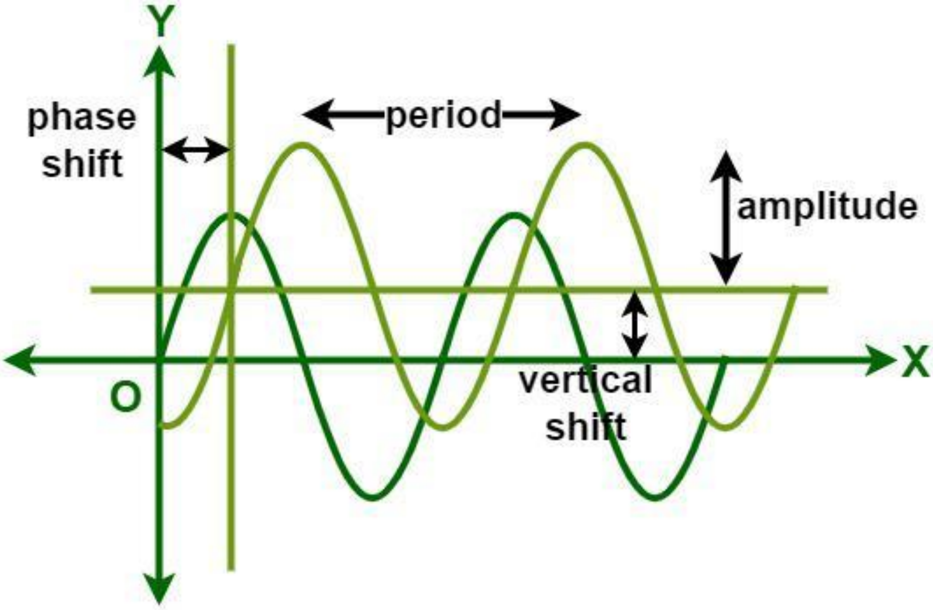
Where:

- ✓ T = the period of the pendulum.
- ✓ L = the length of the string (or the distance from the pivot point to the child).
- ✓ g = the acceleration due to gravity.

This equation tells us that the period of a pendulum depends on its length and the gravitational acceleration. A longer pendulum will have a longer period, while a shorter pendulum will have a shorter period.

4. **What strategy are you using to get the graphs of trigonometric functions?**

To sketch the trigonometry graphs of the functions without shift, we need to know the period, phase, amplitude, maximum and minimum turning points. However, if the trigonometric function has vertical and horizontal shift, for example, for a graph of the sine function, we need to convert the given function to the general form as a sin (bx – c) + d in order to find the different parameters such as amplitude, phase shift, vertical shift and period, where, |a| = Amplitude, 2π/|b| = Period, c/b = Phase shift, and d = Vertical shift. Similarly, for the cosine function we can use the formula a cos (bx + c) + d. See the diagram below showing a trigonometric function with all the parts labeled.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