Guided Lesson Notes

Name:_____ Date:_____

Graphing Trigonometric Functions Using Technology

Directions: Complete this study guide as you move through the lesson. By taking notes, you are more likely to remember what you are learning. The completed study guide can be used to complete practice activities and to prepare for quizzes and exams. Be sure to save each study guide so you can access it when you need it.

Essential Vocabulary

As you encounter these mathematical terms from within the lesson, enter the meaning and an example (or two) for each of the terms. You can even draw a picture. If there are other unfamiliar words you find, enter them in the blank spaces provided.

trigonometric functions	

Graphing Using Technology

1. A waterwheel with a radius of 4 feet rotates such that half of it is above water and the other half is below the surface. The wheel makes one complete rotation every 8 seconds. The distance between a point on the outside of the wheel and the surface of the water at any point in time can be modeled by the function $y = 4\sin\left(\frac{\pi}{4}(x-1)+6\right)$, where x is in seconds and y is in feet.

   What does the graph of this function look like?

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2. The position of a bob on a spring can be modeled by the function $y = -3\left(\cos\frac{\pi}{6}(x+2) - 3\right)$, where x is in tenths of a second and y is the position in centimeters away from the rest position. It takes the bob approximately 12 tenths of a second (or 1.2 seconds) to complete one cycle (up and down).

   What does the graph look like for one complete cycle?

3. The number of g-forces on a roller coaster can be modeled by the function $y = 2(\cos x + \cos x \sin x)$, where x is in minutes and y is the number of g-forces. Graph the function for the complete 6-minute ride.

4. The amount of water (y) that is entering and exiting a swimming pool through the filtration system in gallons can modeled by the function $y = -3(\sin x - \cos x \sin x)$ after x minutes. What does the graph of this function look like for the first 10 minutes?

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Maximum and Minimum Values

A waterwheel with a radius of 4 feet rotates such that half of it is above water and the other half is below the surface. The wheel makes one complete rotation every 8 seconds. The distance between a point on the outside of the wheel and the surface of the water at any point in time can be modeled by the function $y = 4\sin\left(\frac{\pi}{4}(x-1)+6\right)$, where x is in seconds and y is in feet.

When is the point on the wheel at its highest point above the water?

When is the point on the wheel as deep as it will get?

Trigonometry Function Applications

The height off the ground (y) in feet of the #1 car can be represented by the function $y = 18\sin(0.2(x-5))+20$, with time in x seconds. When does the #1 car on the Ferris wheel reach a height of 36 feet during the 3-minute ride? How many full circles does the Ferris wheel complete during that 3-minute ride?