Unit 5 – Lesson 3 Name_____ Pd. ___
Quiz: Unit Circle Applications

## 1. Write the equation of the function given the following information

a. Write the equation for the sine function with amplitude of 3, a vertical shift down 6, a period of 8 and no phase shift.

b. Write the equation for the cosine function with amplitude of 1, a vertical reflection, a period of $4\pi$, no vertical shift and phase shift of to the left of $\pi$.

## 2. Analyze the follow equation to identify the given information

$$y = -2\sin(\tfrac{1}{2}\theta + \pi) - 3$$

The period = _____

The midline equation = _____

The phase shift = _____

The highest y-value =_____

The lowest y-value =_____

## 3. Applications

**a.** Given a Ferris wheel that is centered 100 feet above the ground with a radius of 90 feet. This Ferris wheel takes 8 minutes to complete a full rotation. If you enter the Ferris wheel on the top, write the equation that best models this function as height (feet) vs. time (minutes). ** Hint, draw this function so that you can best identify if it is the sine or cosine function.

Answer = _____

How long in minutes would it take you to get from the top of the Ferris wheel to the bottom? _____

What is this height at the bottom of the Ferris wheel? _____

**b.** Given a Ferris wheel that is centered 10 feet above ground level with a radius of 50 feet (meaning part of the Ferris wheel goes below ground – you can assume that the amusement park constructed a

slit-like hole in the ground to allow the Ferris wheel to go below ground – creating a more exciting ride). You enter the Ferris wheel at ground level (the equilibrium) as the wheel is on its way down. It takes $4\pi$ minutes to return you to where you started. Write the equation that best models this information. ** Hint, again, draw this function as height (meters) vs. time (minutes) to help you identify if it is a sine or cosine function.

Function: _____

**c.** Given the function $y = 20\cos(\pi m/6) + 20$ that represents the average rain fall in inches each month (with 'm' representing 'which month' (m= 1 is January, m = 2 is February and so on…))

What is the **maximum** rainfall in any given month? Maximum rainfall = _____

What month does this occur? Month = _____

What is the **minimum** rainfall in any given month? Minimum rainfall = _____

What month does this occur? Month = _____