Name _____
Date _____ Period _____

GSE Pre-Calculus: Application of Inverse Trig Functions

1. Amy's family went to an amusement park while they are at the beach. She decides to ride the Ferris wheel so she can look out at the ocean. She was disappointed to find out that a 100 foot building blocked her view for part of the ride. Amy's height, in feet, from the ground as she travels around the Ferris wheel can be found using the following equation where t = time in minutes from the beginning of Amy's ride.

$$h = -60\cos\left(\frac{2\pi}{3}t\right) + 70$$

   a. Using what you know about inverse trig functions, find out how long will it take until Amy can see over the building?

   b. How long will it take Amy to reach the top of the ride?

2. Amy's brothers are going to ride the largest roller coaster at the amusement park. The height of the initial rise of the roller coaster, in feet, with respect to time *t,* in minutes, is modeled by the function

$$h = -100\cos\left(\frac{\pi}{2}t\right) + 120$$

   a. What is the height of the roller coaster at the top of the initial rise (*Hint*: height = vertical shift + amplitude)?

   b. How long does it take to get to the top of the coaster?

   c. If the first drop of the roller coaster is modeled by the function $h = 90\cos(4\pi t) + 130$, and the drop ends 85 feet off the ground, how long does it take to complete the drop?

3. The London Eye Ferris Wheel and Big Ben are two of the more popular tourist attractions in London. Big Ben reaches a height of 96m, but the Ferris Wheel is taller. Sara wants to ride the Ferris wheel, but is apprehensive about how long it will take (each cycle takes 30 minutes).

    a. If the height of the car of the Ferris wheel is modeled by the function below, how long will it take for Sara to get as high up in the air as the top of Big Ben? (assume she gets on at the bottom)

$$h = -60\cos\left(\frac{\pi}{15}\right) + 66$$

    b. How long (from when she first got on) will it take for her to get to the top of the Ferris wheel (*Hint*: height = vertical shift + amplitude)?