Assignment 8: Modeling with Sinusoids **Name_____**

Period _____ Date _____

1. As you ride the Ferris wheel, your distance from the ground varies sinusoidally with time. You were seated in the last seat that was filled (which is when the Ferris wheel begins to spin). Let *t* be the number of seconds that have elapsed since the wheel started spinning. You find that it takes you 10 seconds to reach the top, 45 feet above the ground (which means that the wheel makes one revolution every 20 seconds). The diameter of the wheel is 40 feet.

i) Find an equation that models your height off the ground in terms of *t* (*t*=0 is when the wheel began to spin)

ii) Find your height from the ground after 65 seconds.

iii) Find your height from the ground after 2 minutes and 12 seconds.

2. Cole is floating on a tube in the wave pool at White Water. At t = 3 seconds, Cole reaches a maximum height of 12 ft above the bottom of the pool. At t = 9 seconds, Cole reaches a minimum height of 2 ft above the bottom of the pool.

i) Write an equation for Cole's height based on the time since the wave pool started (t = 0 seconds).

ii) What is Cole's height after 40 seconds.

3. A pendulum on a grandfather clock is swinging back and forth as it keeps time. A device is measuring the distance the pendulum is above the floor as it swings back and forth. At the beginning of the measurements the pendulum is at its highest point, 40cm high exactly one second later it was at its lowest point of 10cm. One second later it was back to a highest position.

Write an equation for height of the pendulum based on the time since the first maximum (t = 0 seconds).

4. Sam is riding his bike home from school one day and picks up a nail in his tire. The nail hits the ground every 1.5 seconds and reaches a maximum height of 32 in (assume the tire does not deflate).

Write an equation for height of the nail based on the time since the nail was at its maximum (t = 0 seconds).