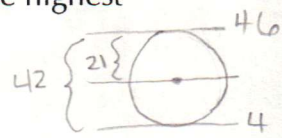
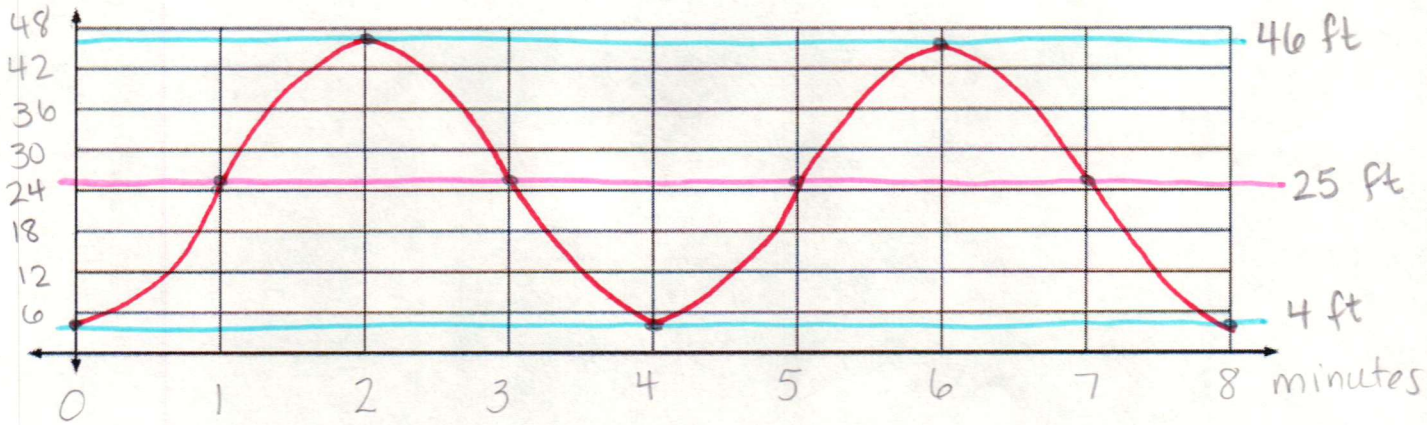
AGS 3 Name: _____ Period: _____ Date: _____

Notes 7.6 – Periodic Graph in Context

1. As you ride a Ferris wheel, the height that you are above the ground varies periodically. Consider the height of the center of the wheel to be the equilibrium point. Suppose the diameter of a Ferris wheel 42 feet and makes a revolution every 4 minute. At the highest point, a seat on the Ferris wheel is 46 feet above the ground.





a. What is the lowest height of a seat? 4 feet

b. What is the value of the midline? 25 feet

$4 + 21 =$

c. What is the period of the function? 4 minutes $b = \frac{2\pi}{4\text{min}} = \frac{\pi}{2}$

d. Write a sinusoidal equation to model the height of a seat that was at the equilibrium point heading upward when the ride began?

$y = -21\cos\left(\frac{\pi}{2}x\right) + 25$

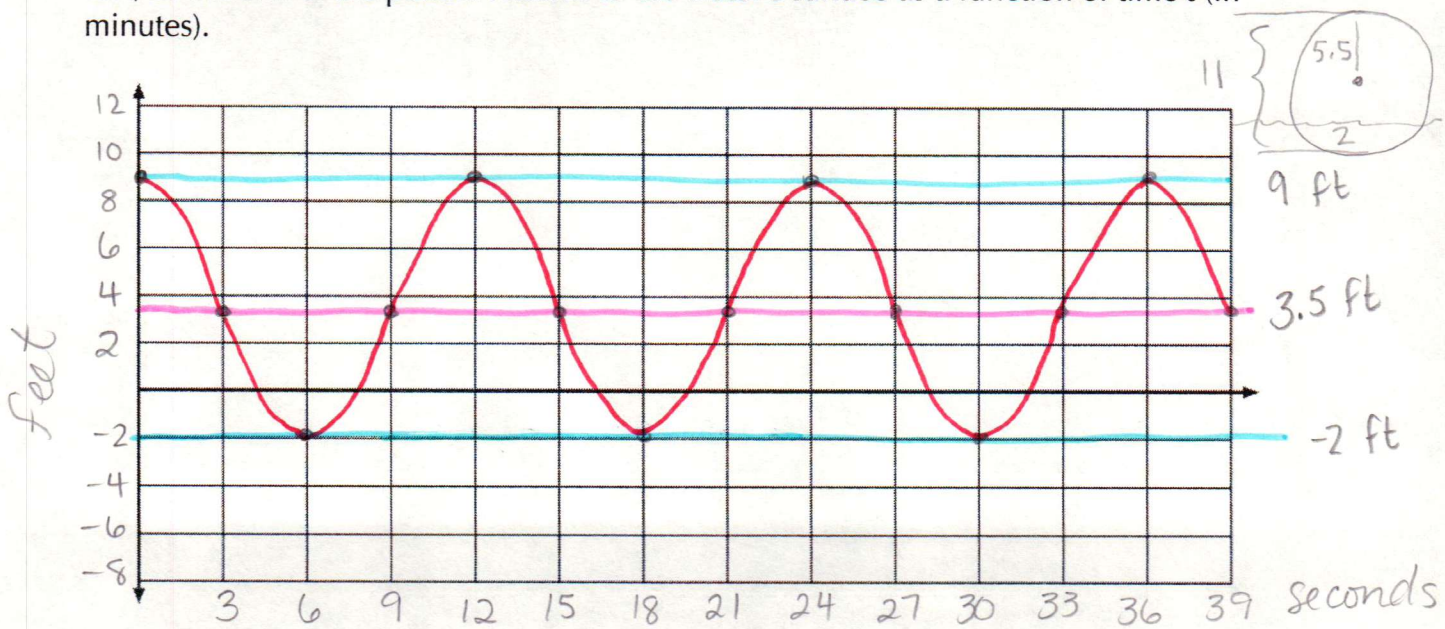
e. According to the model, when will the seat reach the highest point for the first time?

2 minutes

f. According to the model, what is the height of the seat after 10 minutes?

$y = -21\cos\left(\frac{\pi}{2}(10)\right) + 25 = 46$ feet or at the top

2. The paddle wheel of a ship is 11 feet in diameter, revolves once every 12 second when moving at top speed, and is 2 feet below the water's surface at its lowest point. Using this speed and starting from a point at the very top of the wheel, write a model for the height h (in feet) of the end of the paddle relative to the water's surface as a function of time t (in minutes).



Model:

amplitude : 5.5 feet

vertical shift : 3.5 feet

period : 12 seconds

$y = 5.5 \cos\left(\frac{\pi}{6}x\right) + 3.5$

$b = \frac{2\pi}{12} = \frac{\pi}{6}$

What is the height of the end of the paddle at 18 seconds and 27 second?

$y = 5.5 \cos\left(\frac{\pi}{6}(18)\right) + 3.5 = -2$ feet, at the bottom

$y = 5.5 \cos\left(\frac{\pi}{6}(27)\right) + 3.5 = 3.5$ feet, at the middle