Day 4 Notes

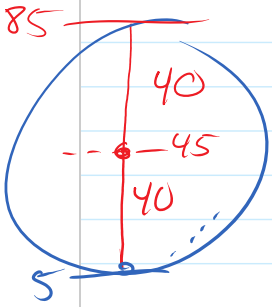
Sunday, January 31, 2016 1:44 PM

Precalculus
4.4 Applications

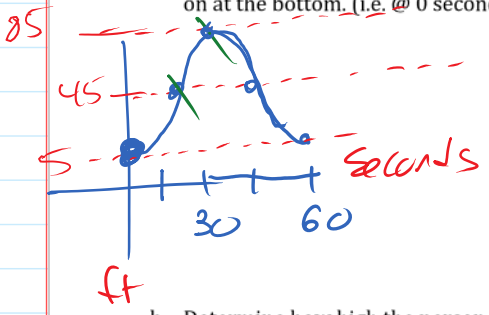
Name:
Period:

1. A Ferris wheel with radius 40 feet completes 1 revolution every 60 seconds. The lowest point of the wheel is 5 feet above ground.

Per = 60 $\quad 60 = \frac{2\pi}{b}$



a. Determine an equation representing the path of a person on the Ferris wheel, assuming they get on at the bottom. (i.e. @ 0 seconds, they are 5 feet above ground.)



$y = -40\cos\frac{\pi}{30}(x) + 45$

or $y = 40\sin\frac{\pi}{30}(x-15) + 45$

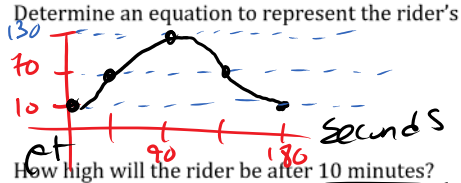
b. Determine how high the person will be after riding for 20 seconds.

x

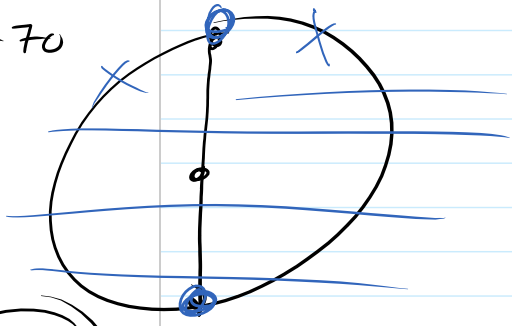
$y = 65$ ft $\qquad y = -40\cos\left[\frac{\pi}{30}(20)\right] + 45$

2. A Ferris wheel 120 feet in diameter completes 1 revolution every 180 seconds. The lowest point is 10 feet above ground. At time t=0, the rider is 10 feet above ground.

a. Determine an equation to represent the rider's path.



$y = -60\cos\frac{\pi}{90}x + 70$



b. How high will the rider be after 10 minutes?

L 600

100 ft

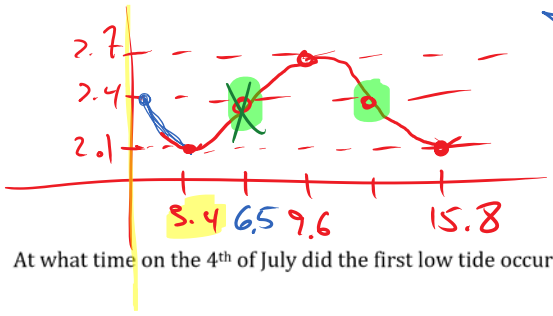
c. When will the rider be 130 feet above ground?

$130 = -60\cos\frac{\pi}{90}x + 70$

90 sec

3. On the 4th of July in Galveston, Texas, high tide occurred at 9:36 A.M. At that time, the water at the end of the 61st Street Pier was 2.7 meters deep. Low tide occurred at 3:48 P.M. at which time the water was only 2.1 meters deep. Assume that the depth of the water is a sinusoidal function of time with a period of half a lunar day (about 12 hours and 24 minutes).

a. Write an equation to model the ebb and flow of the tide



$y = -.3\cos\frac{\pi}{6.2}(x - 3.4) + 2.4$

or

$y = .3\cos\frac{\pi}{6.2}(x - 9.6) + 2.4$

b. At what time on the 4th of July did the first low tide occur?

3:24 AM — 3:48 PM

12 hr 24 min

c. What was the approximate depth of the water at 6:00 A.M. and at 3:00 P.M. that day?

6 → x → 2.32

15 → x → 2.12

d. What was the first time on July 4th when the water was 2.4 meters?

y

.3 → 12:18 AM

6.5 → 6:30 AM