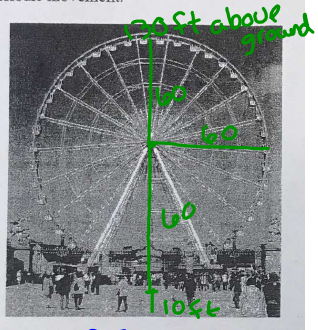
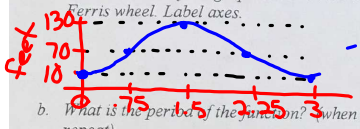
Applications of Trig Graphs p. 45

There are many rides at the amusement park whose movement can be described using trigonometric functions. The Ferris Wheel is a good example of periodic movement.

1. Sydney wants to ride a Ferris wheel that has a radius of 60 feet and is suspended 10 feet above the ground. The wheel rotates at a rate of 2 revolutions every 6 minutes. (Don't worry about the distance the seat is hanging from the bar.) Let the center of the wheel represents the origin of the axes.



a. Make a sketch of the graph based on the movement of the Ferris wheel. Label axes.



- cosine curve

b. What is the period of the function? (when does the cycle repeat)

3 minutes

per = $\frac{2\pi}{b}$

$\frac{3}{1} = \frac{2\pi}{b}$

$3b = 2\pi$

$b = \frac{2\pi}{3}$

c. What is the maximum height? (ceiling) 130 ft

d. What is the minimum height? (floor) 10 ft

e. What is the midline of the function? (The midline is the average of the max and min height.) 70 ft

f. What is the amplitude of the function? (from midline to the highest or lowest point) 60 ft

g. Write a function that describes a Sydney's height above the ground ~~as a function of the number of seconds since she was ¼ of the way around the circle (at the 3 o'clock position)~~

$a = 60$ $b = \frac{2\pi}{3}$ $d = 70$ $c = 0$

$f(x) = -60\cos\frac{2\pi}{3}(x) + 70$

2. Use your equation above to find how high Sydney is after 1.25 minutes?

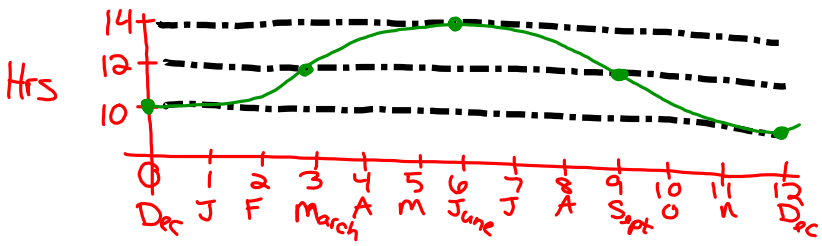
*Radian mode!

$f(1.25) = -60\cos\left(\frac{2\pi}{3}(1.25)\right) + 70$ ← need in calc

$f(1.25) = 121.96$ ft

Weather model:

14 hrs daylight in June
10 hrs " in Dec.
12 hrs " in March + Sept.



$a = 2$ $c = 0$
$d = 12$ $b = \frac{\pi}{6}$

per = 12

$\frac{2\pi}{b} \cdot \frac{12}{1}$

$12b = 2\pi$

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

$f(x) = -2\cos\frac{\pi}{6}(x) + 12$

$f(\text{April}) = -2\cos\frac{\pi}{6}(4) + 12$

$= 13$ hrs

Feb 28-3:52 PM