Calculating the Ebb and Flow of Tides for Maui

$\frac{36}{60} = .6$ 12.6

$\frac{2}{60} = .0\overline{3}$

February 12th, 2016, high tide occurred at 7:02 pm. At that time the water was 1.5 meters deep. Low tide occurred at 12:36 p.m, at which time the water was only .2 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 hrs 24 min)

$\frac{24}{60} = .4$ 12.4 hrs

a) Model the depth, D, as a sinusoidal function of time, t, algebraically then graph the function.

$A = \frac{max - min}{2}$

$= \frac{1.5 - .2}{2} = \frac{1.3}{2} = .65$

$D = \frac{max + min}{2} = \frac{1.5 + .2}{2}$

$\frac{1.7}{2} = .85$

$B = \frac{2\pi}{Per} = \frac{2\pi}{12.4} = \frac{\pi}{6.2}$

Low tide

$y = -.65 \cos \frac{\pi}{6.2}(x - 12.6) + .85$

hight tide

$y = .65 \cos \frac{\pi}{6.2}(x - 19.0\overline{3}) + .85$

b) At what time did the first low tide occur? $(.2)(60) = 12$

$x = .1\overline{9}$ 12:12 am

c) What was the approximate depth of the water at 6:00 am and at 3:00 pm?

6:00 am Let $x = 6$ = 1.487 m

3:00 pm Let $x = 15$ = .62 m

d) What was the first time on this day when the water was 1 meter deep?

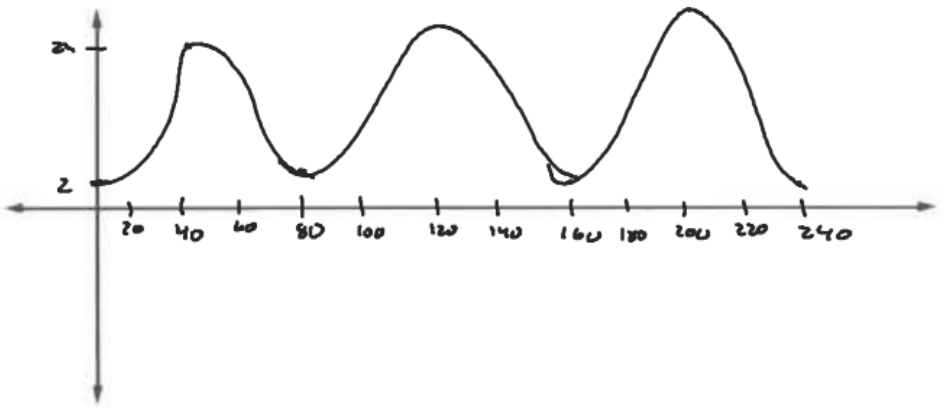
3.76 3:46 am

The center of a Ferris wheel is 12 meters above the ground. The Ferris wheel itself has a diameter of ~~20~~ 20 meters. The wheel turns counterclockwise at a constant rate and takes 80 seconds to make one complete revolution.

$Y = -10\cos\frac{\pi}{40}X + 12$

22
10
2
12

a. Suppose Jim and his friends enter a seat directly below the center of the Ferris Wheel. Sketch a graph that you would expect to show their height above the ground during a four-minute ride. Label the x-axis of your sketch using seconds. Label the y-axis using meters.



b. What is the maximum height of the Ferris wheel? Minimum height?

c. Write the equation to model path of the Ferris wheel.