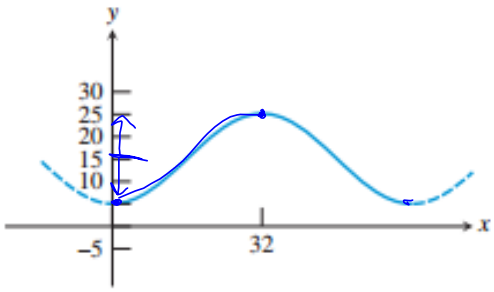
4.5 Applications

1.) Write the equation of a sinusoid that rises from a minimum value of y = 5 at x = 0 to a max value of y = 25 at x = 32.

$y = a\ \sin/\cos(b(x-c))+d$



$d = 15$

$a = 10$

$-\cos$

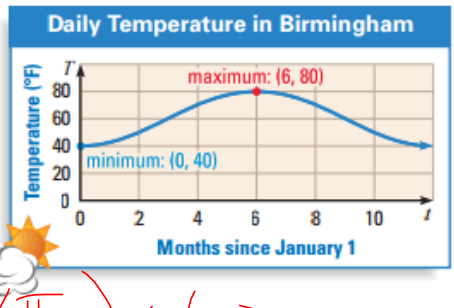
$64 = \frac{2\pi}{b}$

$\frac{64b}{64} = \frac{2\pi}{64}$

$b = \pi/32$

$y = -10\cos\left(\frac{\pi}{32}x\right)+15$

2.) ***Write a trigonometric model for the average daily temperature in Birmingham, Alabama.***



$d = 60$ $-\cos$

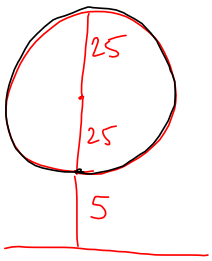
$a = 20$

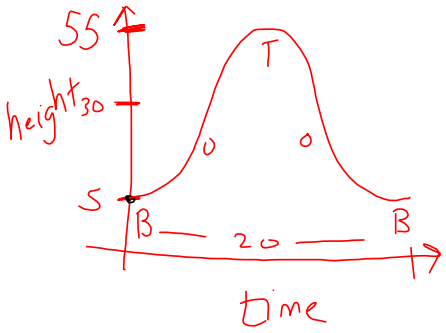
$12 = \frac{2\pi}{b}$

$b = \pi/6$

$y = -20\cos\left(\frac{\pi}{6}x\right) + 60$

3.) A ferris wheel with a radius of 25 feet is rotating at a rate of 3 revolutions per minute. When t = 0, a chair starts at the lowest point on the wheel, which is 5 feet above the ground. Write a model for the height h (in feet) of the chair as a function of the time t (in seconds).





$d = 30$

$a = 25$

$P = 20 = \frac{2\pi}{b}$

$b = \frac{\pi}{10}$

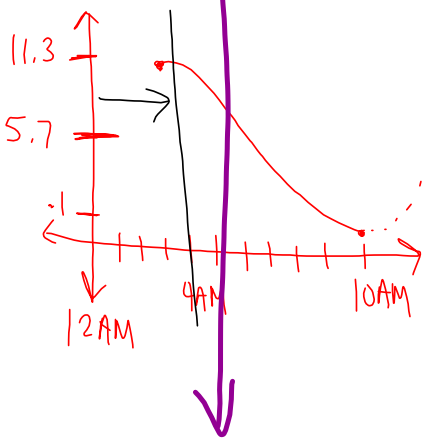
$-\cos$

$$h(t) = -25\cos\left(\frac{\pi}{10}x\right) + 30$$

3.) Throughout the day, the depth at the end of a dock in Bar Harbor, Maine varies with the tides. At 4 A.M. the tide has a max of 11.3 feet and at 10 A.M., the tide is 0.1 feet.

.85ft 10.5ft

a.) Use a trigonometric function to model the data.
b.) Find the depths at 9 A.M. and 3 P.M.
c.) A boat needs at least 10 feet of water to motor at the dock. During what times in the afternoon can it safely dock?



d = 5.7
a = 5.6
P.S.: 4
+cos
$12 = \frac{2\pi}{b}$
$b = \frac{\pi}{6}$
$y = 5.6\cos\left(\frac{\pi}{6}(x-4)\right)+5.7$

14.7 → 17.3

2:42 → 5:18

Dec 7-11:32 AM