4.5 Continued...

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

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.

$d = \frac{25+5}{2} = 15$

$a = 10$

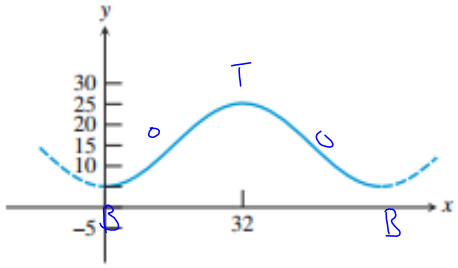
$-\cos$

$\frac{2\pi}{b} = \text{Period}$

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

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

$b = \frac{\pi}{32}$



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

Dec 3-11:51 AM

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

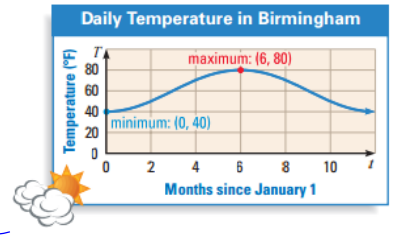
$d = 60$

$a = 20$

$-\cos$

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

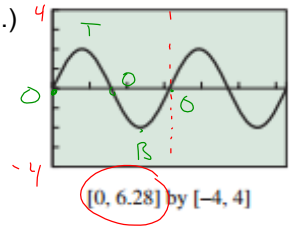
$b = \frac{\pi}{6}$



$y = -20\cos\frac{\pi}{6}x + 60$

Practice: Write the equation of a sinusoid function given the graph below.

3.)



$a = 2$

$d = 0$

$\sin$

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

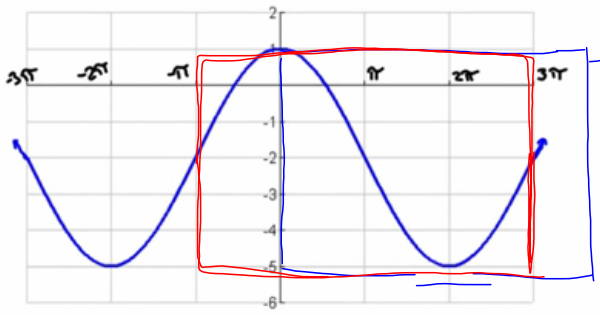
$b = 2$

$y = 2\sin 2x$

Dec 3-11:55 AM

Write the equation of the sin/cos functions given the graph.
Box the period you used to write the equation.

4.)



cos: $d = -2$, $a = 3$, $4\pi = \frac{2\pi}{b}$, $b = \frac{1}{2}$

$y = 3\cos\left(\frac{1}{2}x\right) - 2$

sin: $d = -2$, $a = 3$, $b = \frac{1}{2}$, Phase Shift: $-\pi$

$y = 3\sin\left(\frac{1}{2}(x+\pi)\right) - 2$

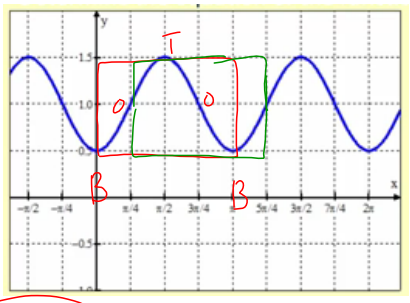
$y = 3\sin\left(\frac{1}{2}x + \frac{\pi}{2}\right) - 2$

Dec 3-11:36 AM

Write the equation of the sin/cos functions given the graph.
Box the period you used to write the equation.

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

5.)



$a = \frac{1}{2}$, $d = 1$, $b = 2$

Phase Shift: $\pi/4$

sin

$y = \frac{1}{2}\sin\left(2\left(x - \frac{\pi}{4}\right)\right) + 1$

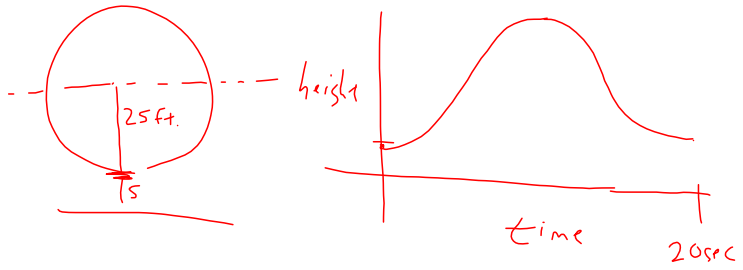
$y = \frac{1}{2}\sin\left(2x - \frac{\pi}{2}\right) + 1$

$a = \frac{1}{2}$, $d = 1$, $-\cos$, $\pi = \frac{2\pi}{b}$, $b = 2$

$y = -\frac{1}{2}\cos(2x) + 1$

Dec 6-6:44 PM

6.) ***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).***



3 rev/min

$d = 30$

$a = 25$

$-\cos$

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

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

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

Dec 6-6:44 PM

7.) ***Throughout the day, the depth at the end of a dock in Bar Harbor, Maine varies with the tides. The table shows the depths (in feet) at various times during the morning.***

4AM : 11.3 ft

10AM : .1 ft

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?

(4, 11.3)

(10, .1)

12 hours = P

$d = 5.7$

Phase Shift: 4

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

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

$a = 5.6$

$+\cos$

$y = 5.6\cos\left(\frac{\pi}{6}(x-4)\right) + 5.7$

$y = 5.6\cos\left(\frac{\pi}{6}x - \frac{2\pi}{3}\right) + 5.7$

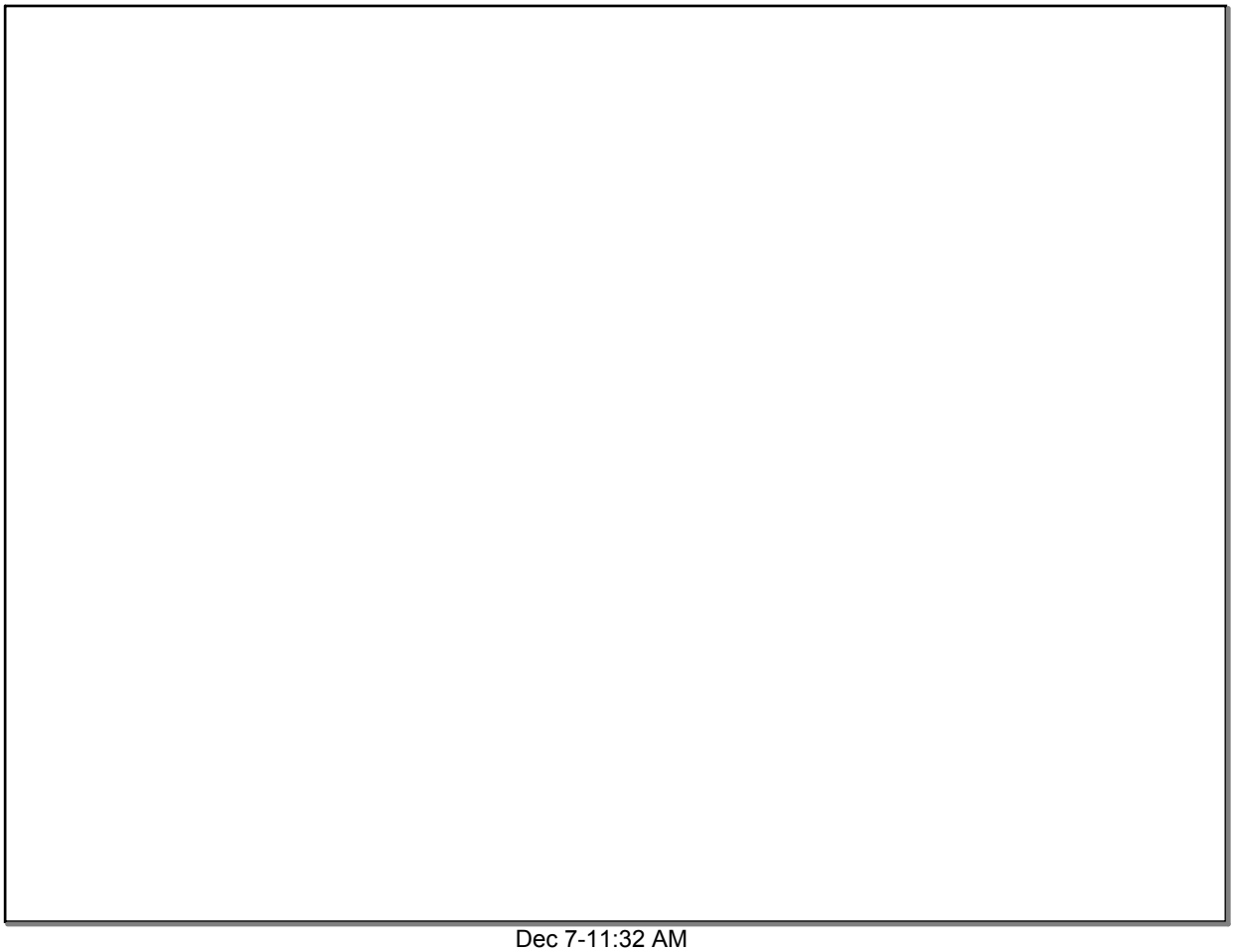
14.7 – 17.3

2:42 – 5:18 pm

9AM : $x = 9$ $y = .85$ .85 ft

3PM : $x = 15$ $y = 10.55$ 10.55 ft

Dec 6-6:46 PM



Dec 7-11:32 AM