

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 $x = 32$.

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

$$a = 10$$

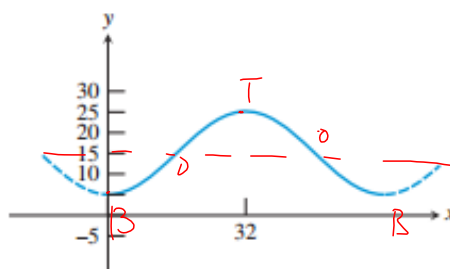
$$-\cos$$

$$P = 64$$

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

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

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



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

Dec 3-11:51 AM

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

$$\frac{40+80}{2} = 60 = d$$

$$a = 20$$

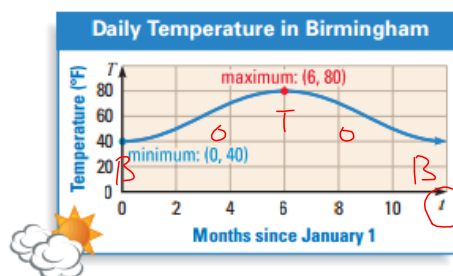
$$-\cos$$

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

$$12b = 2\pi$$

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

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



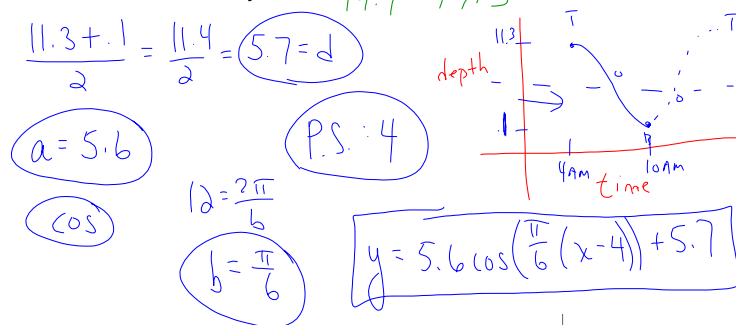
Dec 3-11:55 AM

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.

a.) Use a trigonometric function to model the data.

b.) Find the depths at 9 A.M. and 3 P.M.

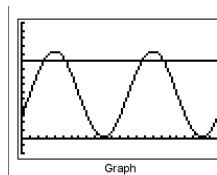
c.) A boat needs at least 10 feet of water to motor at the dock. During what times in the afternoon can it safely dock?



$.7(60)$
 $.3(60)$

14.7 - 17.3

2:42 - 5:18



Dec 6-6:46 PM

Dec 7-11:32 AM