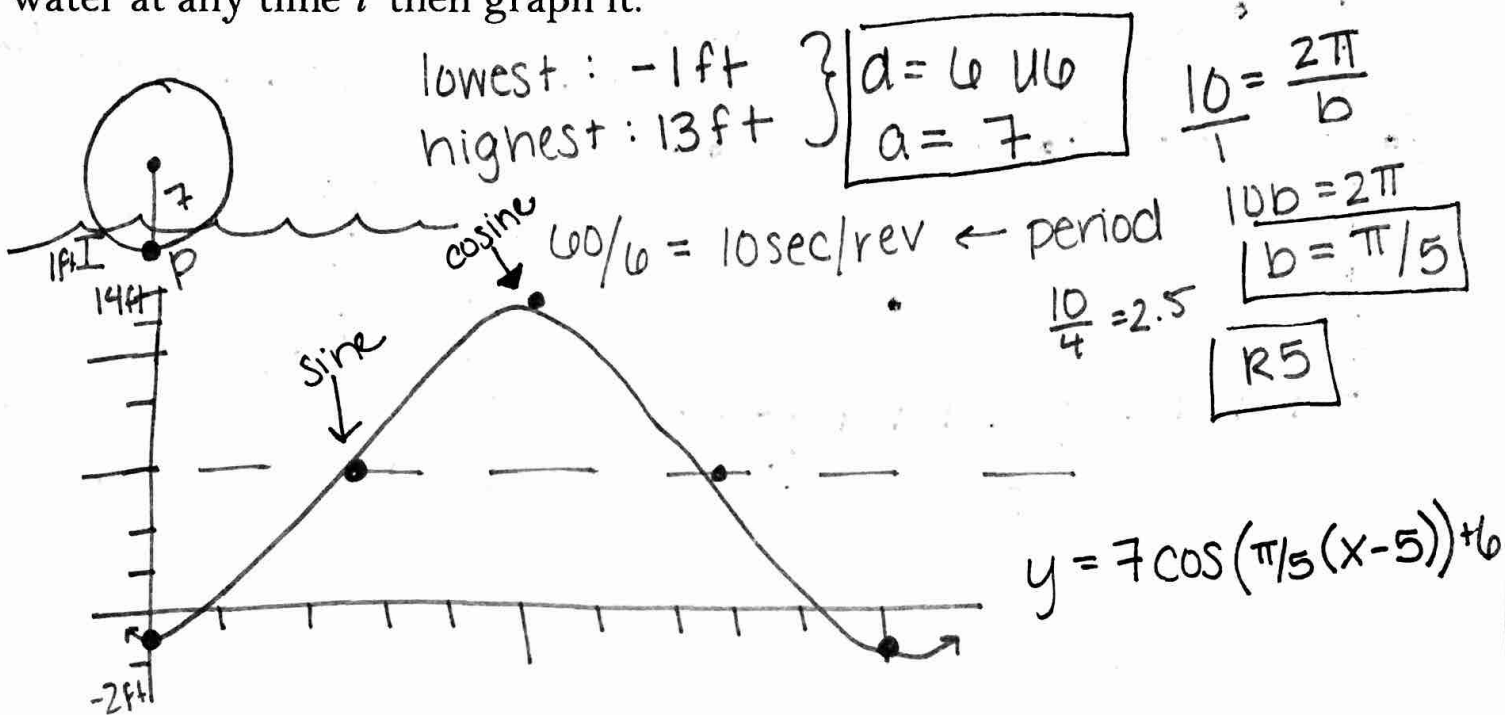


More Modeling Examples - 6/2/15

1. A water wheel with a radius of 7 feet makes 6 revolutions per minute. The center of the water wheel is 6 feet above the surface of the water. You start a stopwatch when a point P (on the rim of the wheel) is at its lowest possible position. Let y be the distance from point P to the surface of the water and t is the time elapsed on your stopwatch.

a. Find a sinusoidal equation that will determine your height above the water at any time t then graph it.

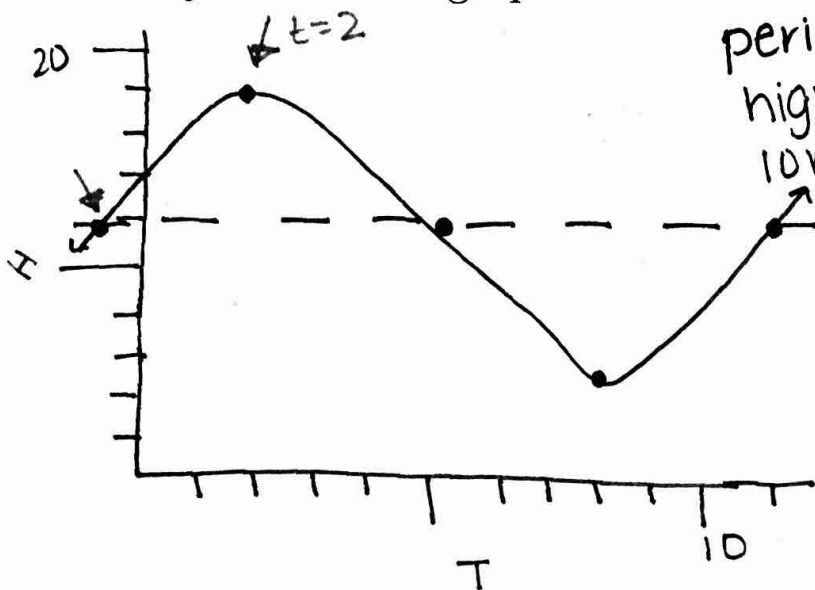


b. How high above the water is point P after 25 seconds?

13ft

2. Cooper Toy Company has designed a new toy that uses a spring that follows a sinusoidal curve after you wind it up and start it. At $t = 2$ seconds, the end of the spring is at its highest point, 18 cm above the ground. 6 seconds later, the spring is at its lowest point, which is 6 cm above the ground.

a. Find a sinusoidal equation that will determine the height of the spring at any time t then graph it.



period: $\frac{6 \cdot 2}{2} = 12$ sec $\rightarrow \frac{12}{4} = 3$

high: 18 } 12 spaces

low: 6

$a = 6, d = 12$ u12

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

$\boxed{4}$

$12b = 2\pi$

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

$y = 6 \sin\left(\frac{\pi}{6}(x+1)\right) + 12$

b. Find the height of the spring after 29 seconds.

12 ft

c. Find the second time the spring reaches a height of 18 cm.

14 sec