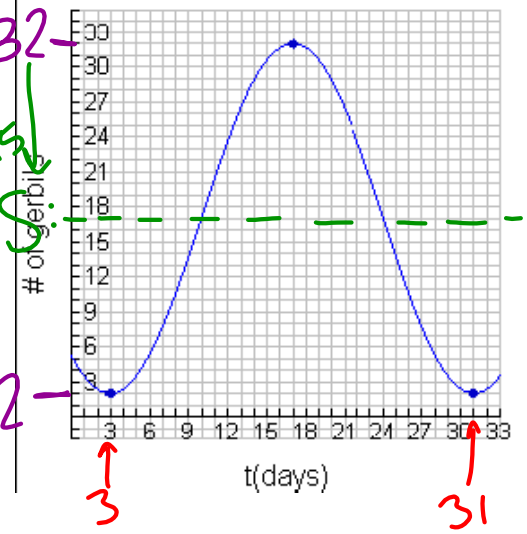
LT: Use sine and cosine functions to model real life situations

Ex 1) A pet store clerk noticed that the population in the gerbil habitat varied sinusoidally with respect to time, in days. He carefully collected data and graphed his resulting equation. Write the equation of the graph.



Amp: $\frac{32-2}{2} = 15$

Per: $31-3=28$

$b \cdot 28 = \frac{2\pi}{b} \cdot b$

$\frac{28b}{28} = \frac{2\pi}{28}$

$b = \frac{2\pi}{28} = \frac{\pi}{14}$

VS: Top - Amp $= 32-15 = 17$

HS: Started @ 3 Point

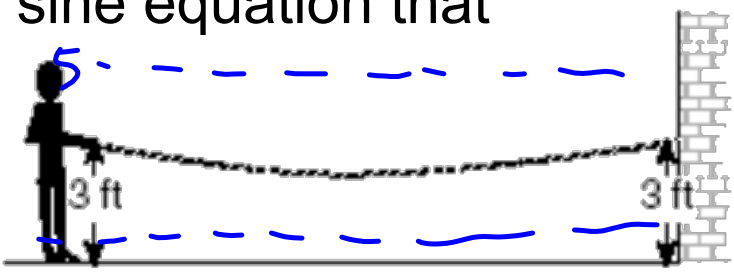
~~$b(x-SP)$~~

$\frac{\pi}{14}(x-3)$

$\frac{\pi}{14}x - \frac{3\pi}{14}$

$f(x) = -15\cos\left(\frac{\pi}{14}x - \frac{3\pi}{14}\right) + 17$

Ex 2) A student attaches one end of a rope to a wall at a fixed point 3 feet above the ground, as show in the accompanying diagram, and moves the other end of the rope up and down, producing a wave. The range of the rope's height above the ground is between 1 and 5 feet. The period of the wave is 4π. Write the sine equation that represents this wave.

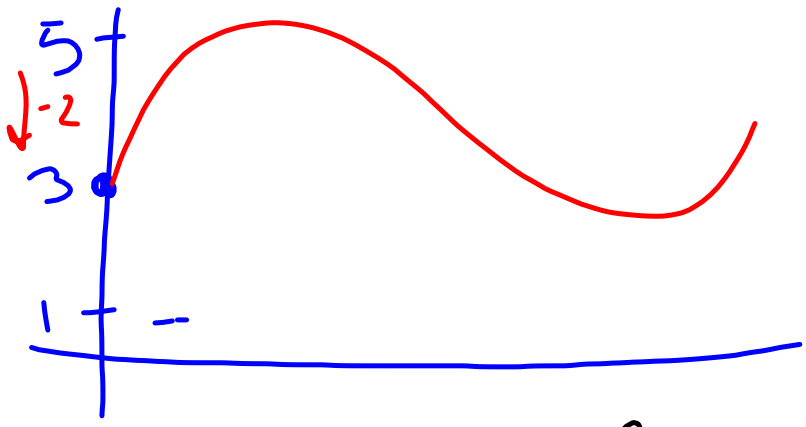


Amp: $2 = \frac{5-1}{2}$

VS: $+3$

Per: 4π

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



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

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

$$b \cdot 4\pi = \frac{2\pi}{b} \cdot b$$

$$\frac{4\pi b}{4\pi} = \frac{2\pi}{4\pi}$$