

Write an equation in terms of sine for the following tables.

- 1.) The average monthly Fahrenheit temperatures for a city are shown in the table below. Write an equation to model the data. (Month 1 = January, Month 2 = February, etc.)

Month	1	2	3	4	5	6	7	8	9	10	11	12
Temperature (°F)	39	40	42	46	50	52	53	52	49	46	42	40

min max

Amplitude: 7 $\frac{53-39}{2} = \frac{14}{2}$

Period: 12
 $B = \frac{\pi}{6}$

Horizontal Shift: $\rightarrow 4$

Vertical Shift: 46 \uparrow $\frac{53+39}{2} = \frac{92}{2}$

Equation: $y = 7 \sin \frac{\pi}{6}(x-4) + 46$

- 2.) The average monthly Fahrenheit temperatures for a city are shown in the table below. Write an equation to model the data. (Month 1 = January, Month 2 = February, etc.)

Month	1	2	3	4	5	6	7	8	9	10	11	12
Temperature (°F)	44	49	56	63	68	70	68	63	56	49	44	42

max min

Amplitude: 14 $\frac{70-42}{2} = \frac{28}{2}$

Period: 12
 $B = \frac{\pi}{6}$

Horizontal Shift: $\rightarrow 3$

Vertical Shift: 56 \uparrow $\frac{70+42}{2} = \frac{112}{2}$

Equation: $y = 14 \sin \frac{\pi}{6}(x-3) + 56$

Write the equation in terms of sine or cosine for the following graph.

3.) Don Quixote, a fictional character in a Spanish novel, attacked windmills because he thought they were giants. At one point, he got snagged by one of the blades and was hoisted into the air. The graph shows his height above ground in terms of time.

Amplitude: 7 * $\frac{17-3}{2}$ $\frac{14}{2} = 7$

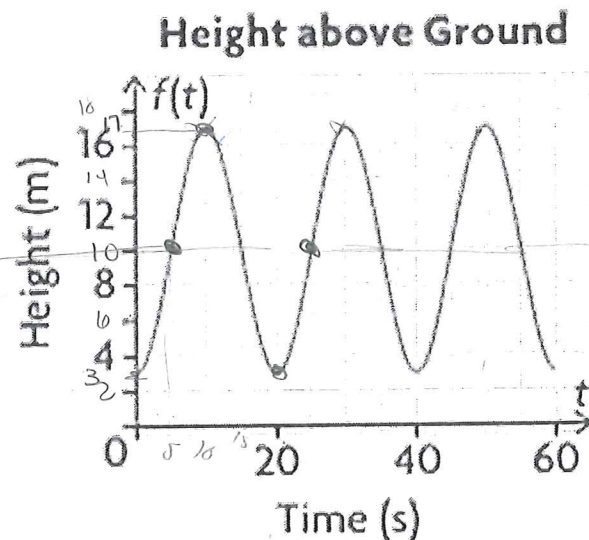
Period: 20
 $\frac{2\pi}{B} = 20$
 $2\pi = 20B$
 $\frac{\pi}{10} = B$

Horizontal Shift: none

Vertical Shift: $10 \uparrow$ $\frac{17+3}{2}$ $\frac{20}{2} = 10$

Equation: $y = -7 \cos \frac{\pi}{10} x + 10$

$y = 7 \cos \frac{\pi}{10} (x-10) + 10$



Sin: $y = 7 \sin \frac{\pi}{10} (x-5) + 10$

4.) Tsunamis, also known as tidal waves, are ocean waves produced by earthquakes or other upheavals in the Earth's crust and can move through the water undetected for hundreds of miles at great speed. The graph shows the height of a tsunami wave in terms of its distance (miles) away from the shore.

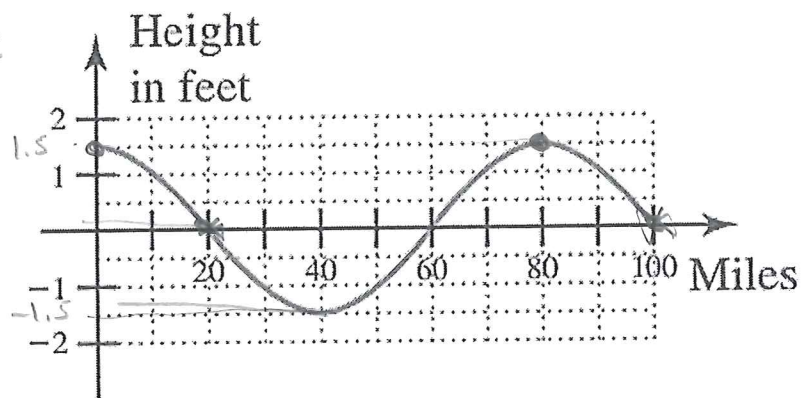
Amplitude: $\frac{3}{2} (1.5)$ $\frac{1.5 - (-1.5)}{2}$ $\frac{3}{2} = \frac{3}{2}$

Period: 80
 $\frac{2\pi}{B} = 80$
 $2\pi = 80B$
 $\frac{\pi}{40} = B$

Horizontal Shift: none

Vertical Shift: none $\frac{1.5 + (-1.5)}{2} = \frac{0}{2} = 0$

Equation: $y = \frac{3}{2} \cos \frac{\pi}{40} x$



Sin: $y = -\frac{3}{2} \sin \frac{\pi}{40} (x-20)$