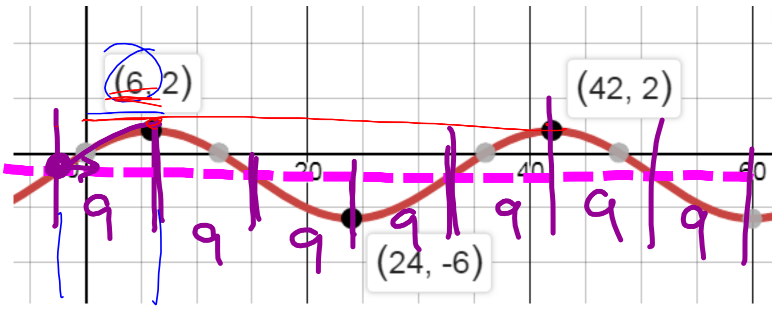
Determine an equation for the given function



Starting Value:

Midline

$$\frac{2+(-6)}{2}$$

$$y=-2$$

Amplitude

$$\frac{2-(-6)}{2}$$

$$=4$$

Period

36 units

$$k=\frac{360}{\text{period}}$$

$$k=10$$

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

$$y=4\sin(10(x+3))-2$$

$$y=4\cos(10(x-6))-2$$

Valeria is playing with her accordion.

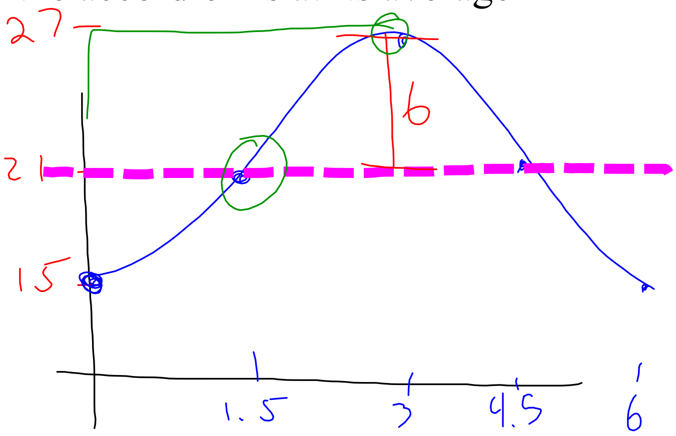
The length of the accordion A(t) (in cm) after she starts playing as a function of time t (in seconds) can be modeled by a sinusoidal expression.

At t=0, when she starts playing, the accordion is 15 cm long, which is the shortest it gets. 1.5 seconds later the accordion is at its average length of 21 cm

Period = 6 sec

$k = \frac{360}{6} = 60$

Amplitude = 6

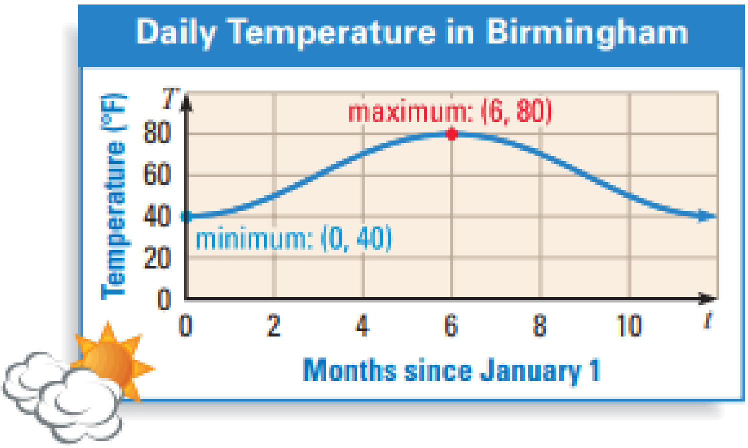


Midline → $y = 21$

$$y = a\cos(k(x-d))+c$$

$$y = 6\cos(60(x-3))+21$$

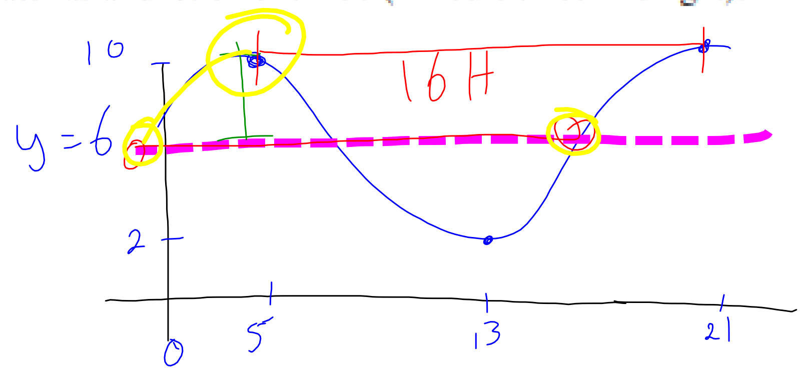
Write a trigonometric model for the average daily temperature in Birmingham, Alabama. ▶ Source: National Climatic Data Center



OCEAN TIDES The height of the water in a bay varies sinusoidally over time. On a certain day off the coast of Maine, a high tide of 10 feet occurred at 5:00 A.M. and a low tide of 2 feet occurred at 1:00 P.M. Write a model for the height h (in feet) of the water as a function of time t (in hours since midnight).

Midline $\frac{\text{Max}+\text{Min}}{2}$

$\frac{10+2}{2} = 6$



Amp → 4

Period = 16

$K = \frac{360}{16}$

$= 22.5$

$h(t) = a\cos(k(t-d)) + c$

$\boxed{h(t) = 4\cos(22.5(t-5)) + 6}$

Determine the height of the tide tomorrow at noon.

t = 36h

$\boxed{h(t) = 4\cos(22.5(t-5)) + 6}$

$h(36) = 4\cos(22.5(36-5)) + 6$

$h(36) = 4\cos(697.5) + 6$

$h(36) = 4(0.924) + 6$

$h(36) = 9.7$

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