

The sine function

$$y = \sin \theta$$

Properties of sine

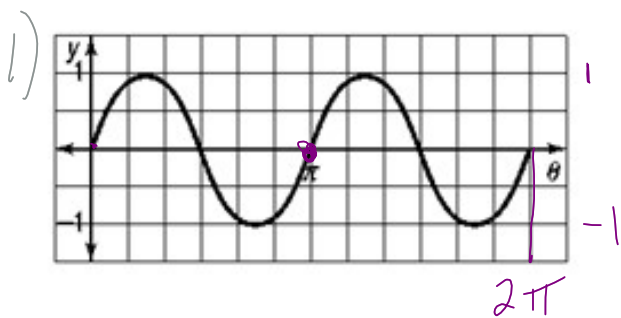
$$y = a \sin b \theta$$

a = amplitude

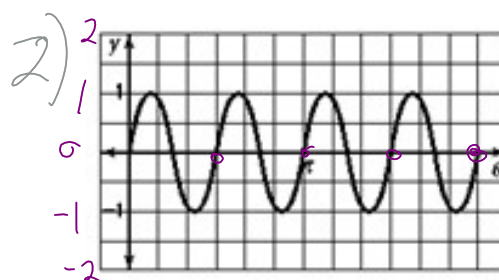
b = # of cycles from 0 to 2π

Period of a sine function is $\frac{2\pi}{b}$

Determine the number of cycles each sine function has in the interval from 0 to 2π . Then find the period of each function.



amplitude = 1
 (b) cycles = 2
 Period = $\frac{2\pi}{2} = \pi$



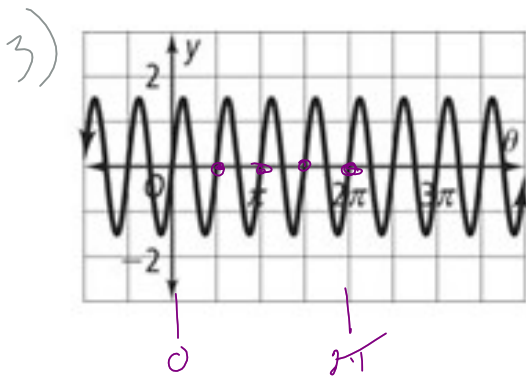
Amplitude = 1
 Cycles = 4
 Period = $\frac{2\pi}{4} = \frac{\pi}{2}$

cycle includes 1 max and 1 min

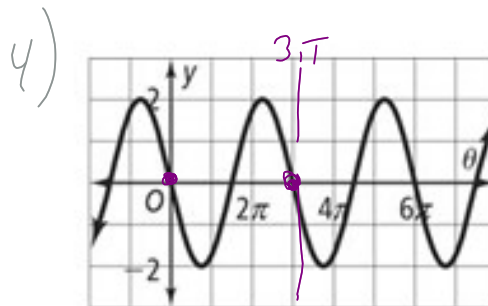
Find the period and amplitude of the following sine curves.

Then write an equation for each sine function.

$$\text{Period} = \frac{2\pi}{b}$$



4 cycles (b)
 amplitude = $\frac{3}{2}$
 period = $\frac{2\pi}{4} = \frac{\pi}{2}$
 $y = \frac{3}{2} \sin 4\theta$



amplitude = 2
 $\frac{3\pi}{1} = \frac{2\pi}{b}$
 $\frac{3\pi b}{3\pi} = \frac{2\pi}{3\pi}$
 $b = \frac{2}{3}$
 $y = -2 \sin \frac{2}{3}\theta$

$b = \# \text{ of cycles}$

Determine the number of cycles each sine function has in the interval from 0 to 2π . Find the amplitude and period of each function.

5) $y = \sin \theta$
 amplitude = 1
 cycles = 1
 Period = $\frac{2\pi}{1} = 2\pi$

(6) $y = \sin 5\theta$
 amplitude = 1, 5 cycles
 Period = $\frac{2\pi}{5}$

7) $y = \sin \pi \theta$
 amplitude = 1, π cycles
 Period = $\frac{2\pi}{\pi} = 2$

(8) $y = 3 \sin \theta$
 amplitude = 3
 1 cycle, Period = 2π

9) $y = -5 \sin \theta$
 amplitude = 5
 1 cycle, Period = 2π

(10) $y = -5 \sin 2\pi \theta$
 amplitude = 5, 2π cycles
 Period = $\frac{2\pi}{2\pi} = 1$

11) The sound wave for a certain pitch fork can be modeled by the function $y = 0.001\sin 1320\pi\theta$. Sketch a graph of the sine curve

amplitude = 0.001
Period = $\frac{2\pi}{1320\pi} = \frac{1}{660}$

