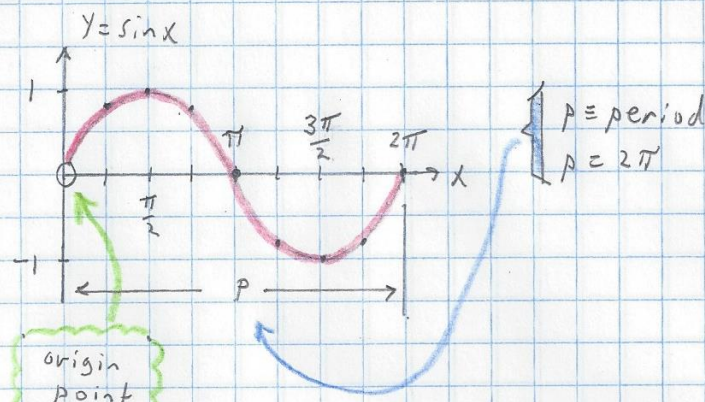


4A.8. The General Sine Wave

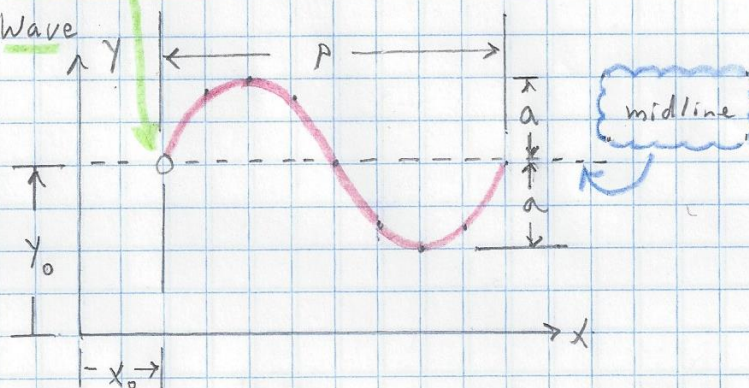
1 of 2

Recall: the graph of $y = \sin x$

x	y
0	0
$\frac{\pi}{4}$	0.7071
$\frac{\pi}{2}$	1
$\frac{3\pi}{4}$	0.7071
π	0
$\frac{5\pi}{4}$	-0.7071
$\frac{3\pi}{2}$	-1
$\frac{7\pi}{4}$	-0.7071
2π	0



The General Sine Wave



$$y = a \sin [b(x - x_0)] + y_0$$

$$2\pi = bP$$

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

$a \equiv$ vertical stretch (amplitude), $a > 0$

$b \equiv$ horizontal stretch

$x_0 \equiv$ horizontal translation

$y_0 \equiv$ vertical translation

4A.8. The General Sine Wave

2 of 2

Example #1. Find the period of

(a) $y = \sin(7x)$ (b) $y = \sin\left(\frac{\pi x}{10}\right)$

SOLUTION:

(a) $p = \frac{2\pi}{b} = \frac{2\pi}{7}$ (b) $p = \frac{2\pi}{b} = \frac{2\pi}{\frac{\pi}{10}} = \frac{2\pi}{1} \cdot \frac{10}{\pi} = 20.$

Example #2. Graph $y = 2\sin\left[\frac{\pi}{6}(x-5)\right] + 3$. On the graph, label the quantities p , b , a , x_0 and y_0 .

SOLUTION:

$$p = \frac{2\pi}{b} = \frac{2\pi}{\frac{\pi}{6}} = \frac{2\pi}{1} \cdot \frac{6}{\pi} = 12$$

