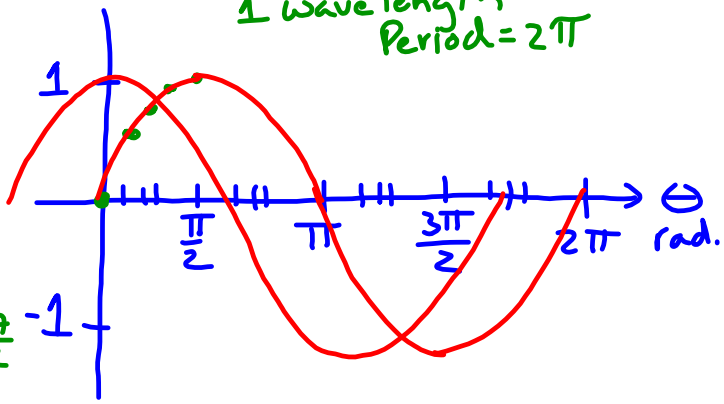
Section 5.3: Graphs of sin & cos

θ	$\sin\theta$	
0	0	$\sin 0$
$\pi/6$	$\frac{1}{2}$	$\sin 30^\circ$
$\pi/4$	0.7	$\sin 45^\circ \approx \frac{\sqrt{2}}{2} \approx \frac{1.4}{2}$
$\pi/3$	0.85	$\sin 60^\circ \approx \frac{\sqrt{3}}{2} \approx \frac{1.7}{2}$
$\frac{\pi}{2}$	1	

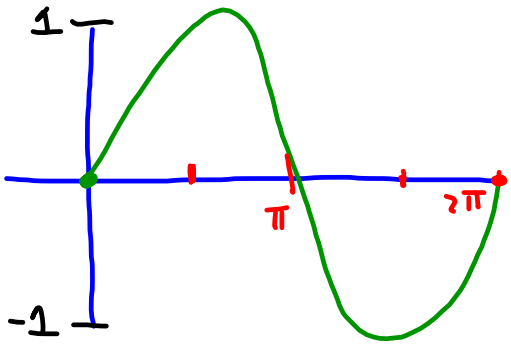
sine wave
1 wavelength
Period $= 2\pi$



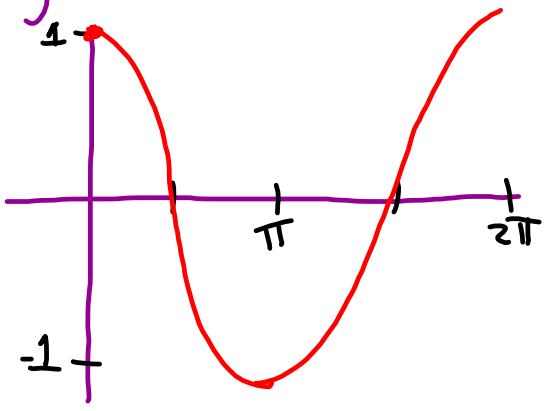
$\sin\theta = \sin(\theta + n2\pi)$

n = any integer

$y = \sin x$



$y = \cos x$



Amplitude

amp = |a| $y = a\sin x$

amplitude = distance to the max or min from the midpoint of the graph

Changing the sign $y = -a\sin x$

reflects the graph over the x-axis (flips upside down)

Period

Period = is the length of a complete cycle.

$y = \sin x$: period = 2π

Period = $\frac{2\pi}{b}$ $y = \sin(bx)$

$y = \sin(2x)$

per = $\frac{2\pi}{2} = \pi$

$y = \sin\frac{x}{2}$

per = $\frac{2\pi}{1/2} = 4\pi$

$y = \sin\frac{3\pi}{2}x$

per = $\frac{2\pi}{3\pi/2} = \frac{4\pi}{3\pi}$

Phase Shift (Horizontal shift)

$y = \sin(x - c)$

$\oplus$ shift left

$\ominus$ shift right

Vertical Shift

$y = d \pm \sin x$ or $y = \pm \sin(x) + d$

$\oplus$ up

$\ominus$ down

$y = d \pm a\sin(b(x-c))$ or $y = \pm a\sin(b(x-c)) + d$

Vert shift

$\oplus$ up

$\ominus$ down

$\ominus$ flip over x-axis

$|a|$ = amplitude

$Per = \frac{2\pi}{b}$ = wavelength/cycle

Phase Shift

$\oplus$ left

$\ominus$ right

book version: $y = A\sin k(x-b)$