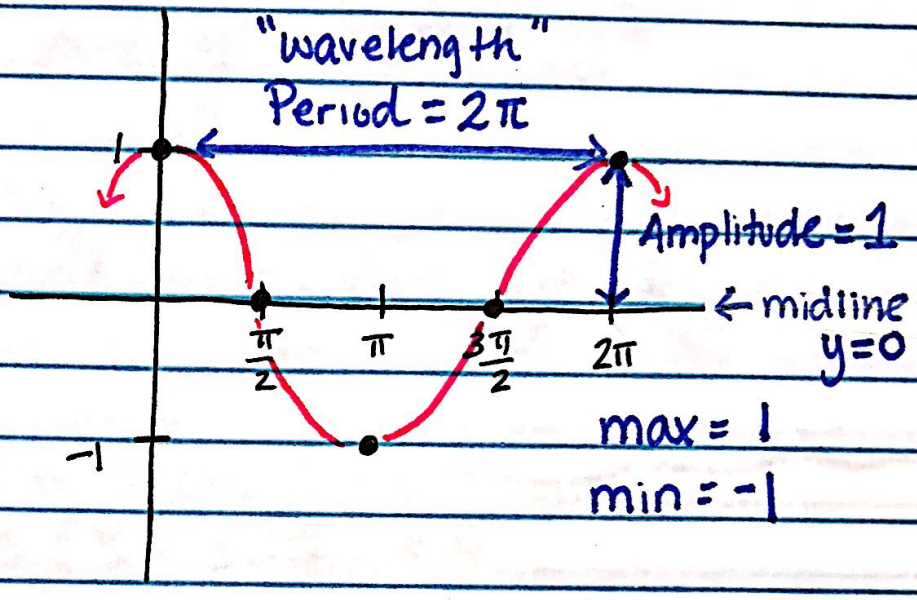
Graphs of Sine and Cosine Functions

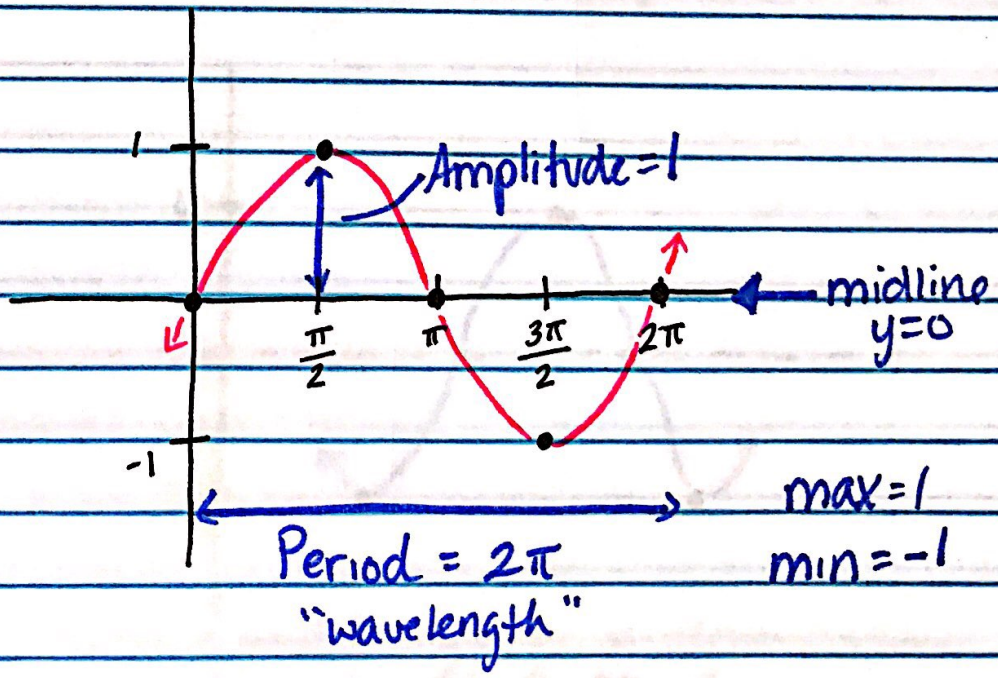
$f(\theta) = \cos\theta$

θ	$f(\theta)$
0	1
$\pi/2$	0
π	-1
$3\pi/2$	0
2π	1



$f(\theta) = \sin(\theta)$

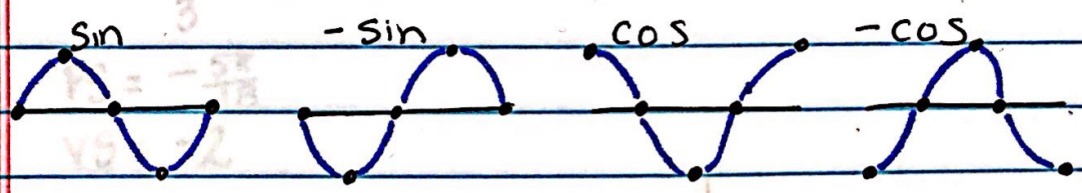
θ	$f(\theta)$
0	0
$\pi/2$	1
π	0
$3\pi/2$	-1
2π	0



Transformations of sine and cosine Graphs

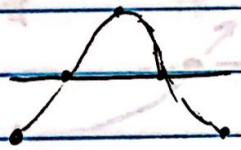
$y = a \cdot \sin[b(x+c)] + d$ ← vertical shift "midline"

- a: amplitude
- b: period $= \frac{2\pi}{b}$
- c: horizontal shift "phase shift"



ex: $y = -2\cos(\pi x - 3\pi) + 4$

$y = -2\cos[\pi(x-3)] + 4$



$A = 2$

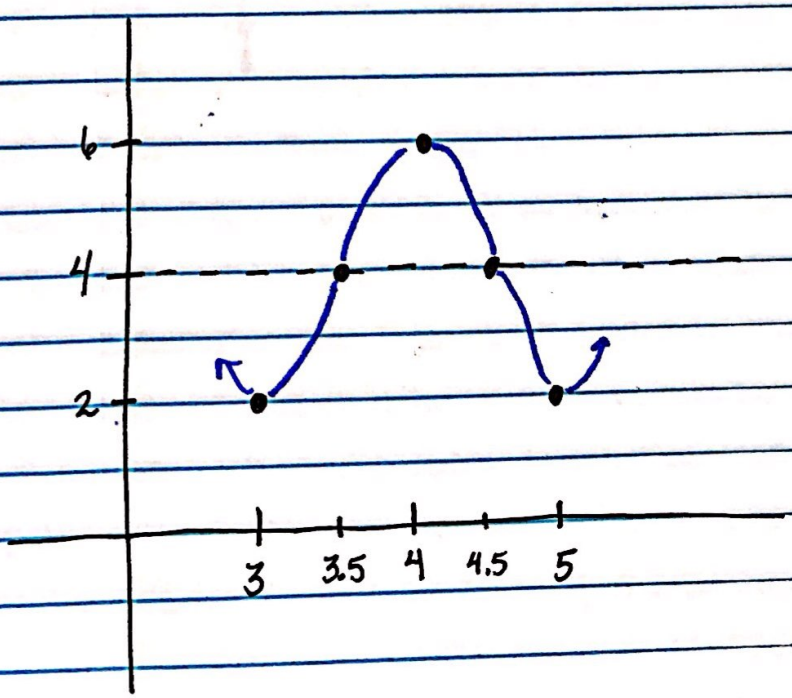
$Per = \frac{2\pi}{\pi} = 2$

$PS = 3$

$VS = 4$

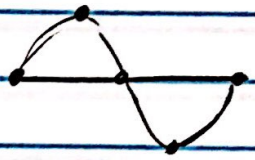
θ	$f(\theta)$
3	2
3.5	4
4	6
4.5	4
5	2

$2 \cdot \frac{1}{4} = \frac{1}{2}$



ex: $y = \sin\left(3x + \frac{5\pi}{6}\right) - 2$

$y = \sin\left[3\left(x + \frac{5\pi}{18}\right)\right] - 2$



$A = 1$

$Per = \frac{2\pi}{3}$

$PS = -\frac{5\pi}{18}$

$VS = -2$

$\frac{2\pi}{3} \cdot \frac{1}{4} = \frac{\pi}{6}$

θ	$f(\theta)$
$\frac{-5\pi}{18}$	-2
$\frac{-\pi}{9}$	-1
$\frac{\pi}{18}$	-2
$\frac{2\pi}{9}$	-3
$\frac{7\pi}{18}$	-2