

Graphing Sine and Cosine Functions

For $y = a \sin bx + k$ or $y = a \cos bx + k$

- > $|a|$ is the amplitude of the function
- > if a is negative the graph flips over the x-axis
- > b is the number of cycles in the interval 0 to 2π
- > $\frac{2\pi}{b}$ is the period of the function
- > k is the vertical shift

Example: Sketch the graph of $y = \sin 2x - \frac{3}{2}$

$|a| = 1$, so the amplitude is 1

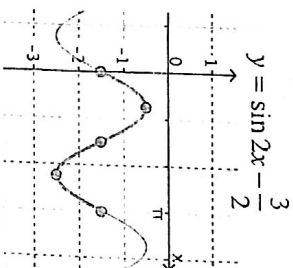
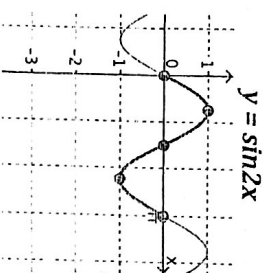
$b = 2$ so there are 2 cycles from 0 to 2π

$\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$ so the period is π

Sketch one cycle of $y = \sin 2x$

Use the 5 key points.

Since $k = -\frac{3}{2}$ translate the graph $\frac{3}{2}$ units down. Sketch the final graph.



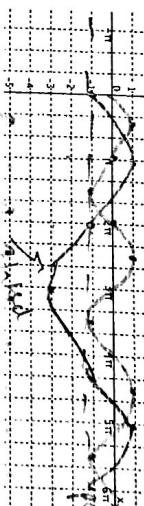
$y = A \sin B(x \pm C) + D$

Graphing Sine and Cosine Practice - Amplitude, Period, & Vertical Shift.

	Amplitude	b - value	period	Vertical Shift
1. $y = -\sin 2x + 3$	1	2	π	up 3
2. $y = 2 \sin (x/2) - 1$	2	$\frac{1}{2}$	4π	down 1
3. $y = 3 \cos 3x + 2$	3	3	$\frac{2\pi}{3}$	up 2
4. $y = -\cos 2x - 3$	1	2	π	down 3



amp = 1
per = π
midline $y = 3$
up 3



amp = 2
per = 4π
mid $y = -1$
(9)



amp = 3
per = $\frac{2\pi}{3}$
up 2
midline $y = 2$



amp = 1
per = π
down 3
midline $y = -3$

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