

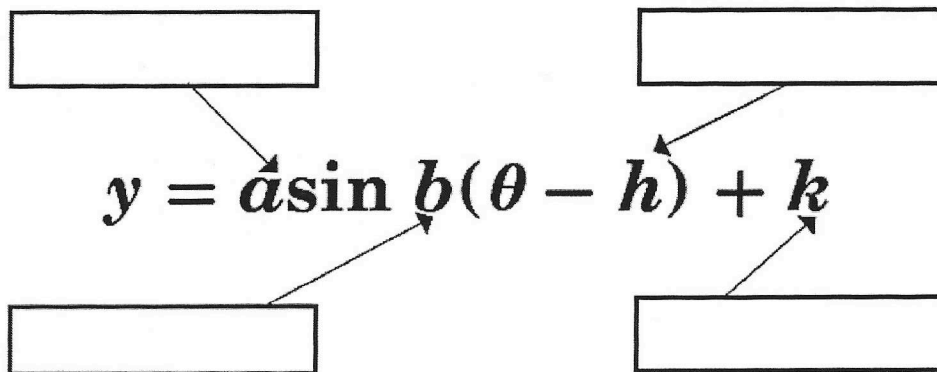
Translations of Trigonometric Graphs

I can identify the amplitude, period, vertical shift, and phase shift of sine and cosine functions.

I can use the translations to graph sine and cosine functions.

I can write the equation of a trigonometric function given the graph.

Label the general sine function shown below with the correct terms. Use *amplitude*, *period*, *phase shift*, and *vertical shift*.



To graph $y = a \sin b(\theta - h) + k$ and $y = a \cos b(\theta - h) + k$

Step 1:

Step 2:

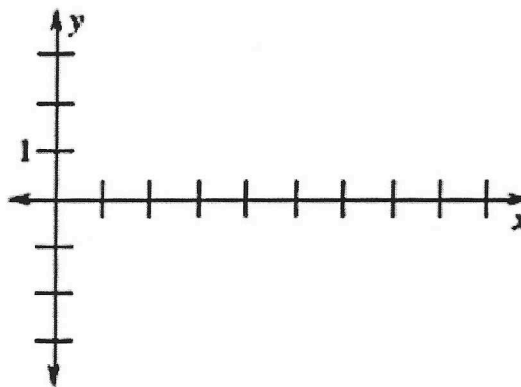
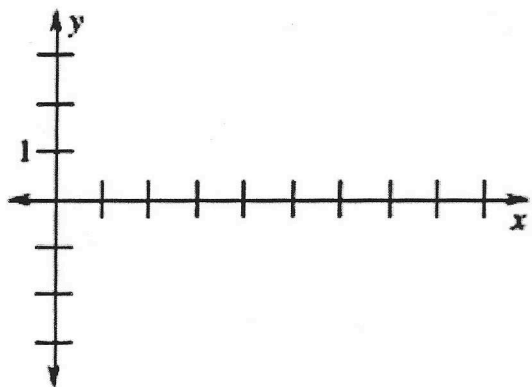
Step 3:

Step 4:

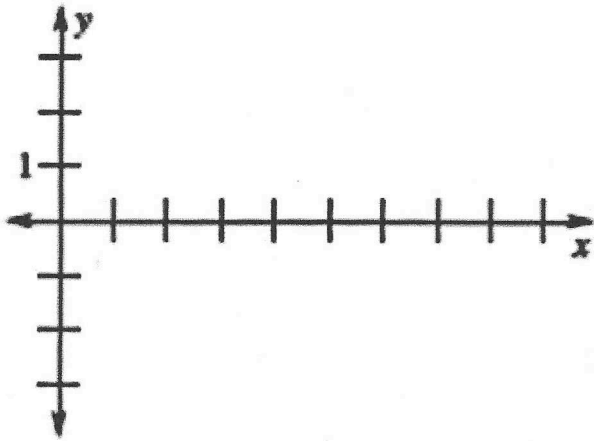
Step 5:

$y = \sin x$

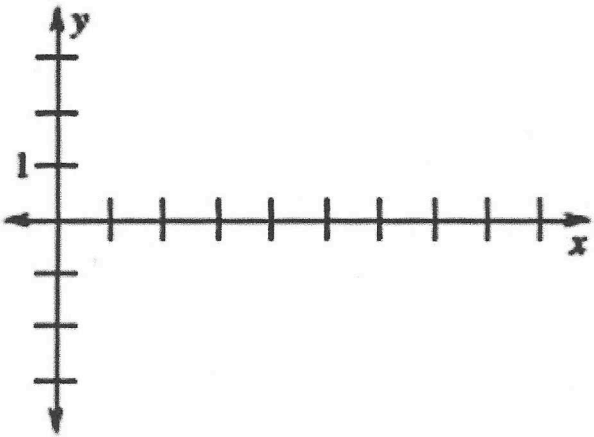
$y = \cos x$



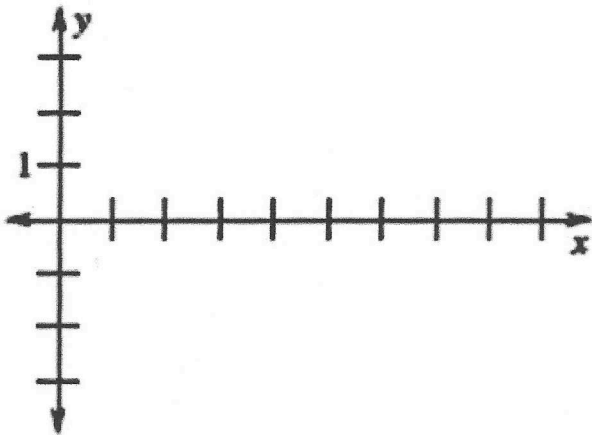
Graph $y = 3 \sin 2x + 1$



Graph $y = \sin\left(2x + \frac{\pi}{2}\right)$



Graph $y = \cos(x + \pi) - 1$



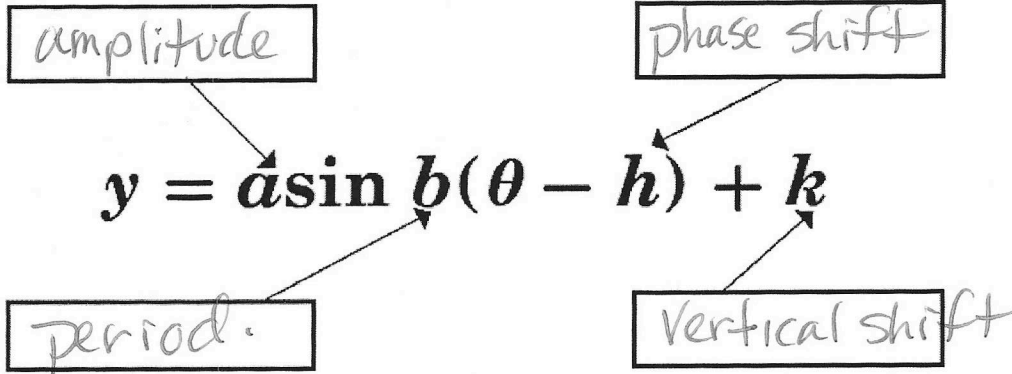
Translations of Trigonometric Graphs

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I can use the translations to graph sine and cosine functions.

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Label the general sine function shown below with the correct terms. Use *amplitude*, *period*, *phase shift*, and *vertical shift*.



To graph $y = a \sin b(\theta - h) + k$ and $y = a \cos b(\theta - h) + k$

Step 1: Identify the amplitude, period, phase shift, and vertical shift

Step 2: Draw the midline: horizontal line $y = k$

Step 3: Find the critical points: $\frac{\text{period}}{4}$

Step 4: graph the parent function - $y = a \cos bx$ or $y = a \sin bx$

Step 5: translate the phase shift (h) and vertical shift (k)

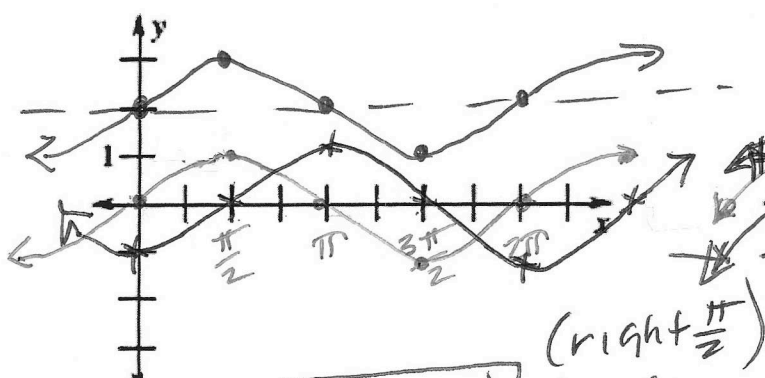
$y = \sin x$

$y = \sin x + 2$ (k) value up 2 (vertical shift)

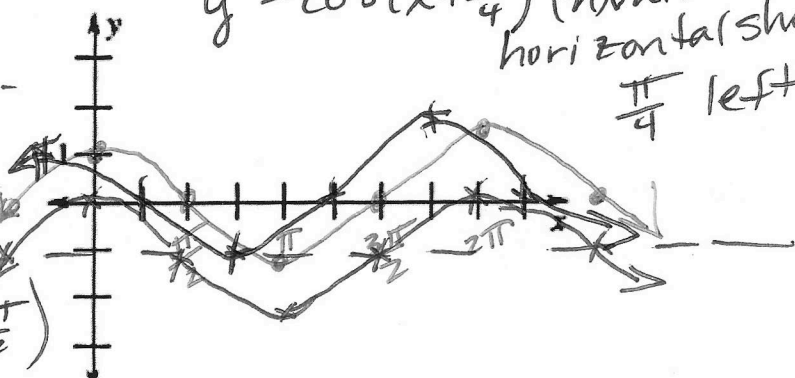
$y = \cos x$

$y = \cos x - 1$ (k) value down 1 (vertical shift)

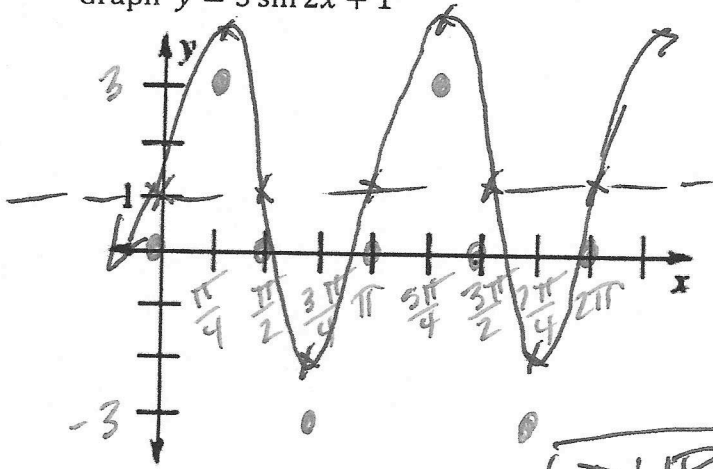
$y = \cos(x + \frac{\pi}{4})$ (h) value horizontal shift $\frac{\pi}{4}$ left



$y = \sin(x - \frac{\pi}{2})$ (h) value horizontal shift (right $\frac{\pi}{2}$)



Graph $y = 3 \sin 2x + 1$



$a: 3$
 period π
 p.s. none
 v.s. up 1

Critical points

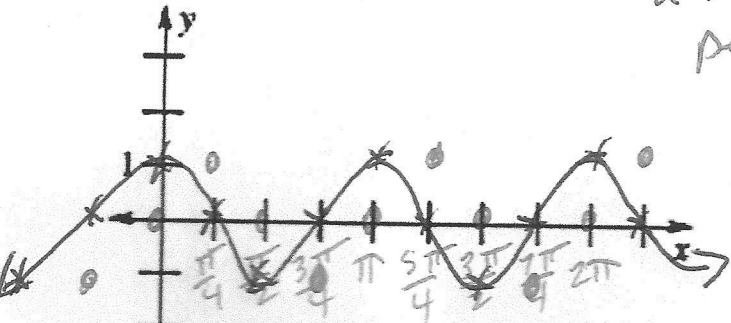
$\frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \pi$

Graph $3 \sin 2x$

$D: \mathbb{R}$
 $R: [-2, 4]$

then move up 1
 move midline to $y=1$

Graph $y = \sin(2x + \frac{\pi}{2})$



$a: 1$
 period: π
 p.s: $\frac{\pi/2}{2} = \frac{\pi}{4}$ left
 v.s. none

$\frac{\pi}{4}$ left

graph: $\sin 2x$

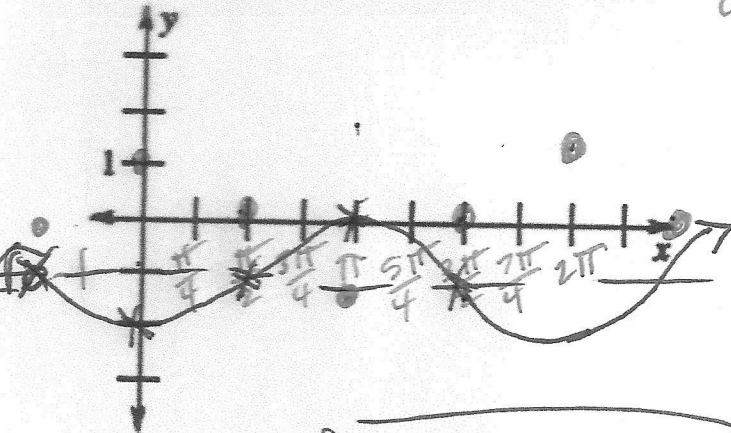
$D: \mathbb{R}$
 $R: [-1, 1]$

Critical points

$\frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \pi$

then move left $\frac{\pi}{4}$

Graph $y = \cos(x + \pi) - 1$



$a: 1$
 $p: 2\pi$
 p.s. π left
 v.s. down 1

graph $y = \cos x$
 then move

π left
 down 1

$D: \mathbb{R}$
 $R: [-2, 0]$

move midline down 1
 $y = -1$