

Sketch the parent sine graph using a dotted line. Then sketch the transformed graph using a solid line. State the shift rules. (Use arrows & numbers. Use horizontal/vertical stretch/shrink.) Draw one period only. Show work for finding the period ($P = \frac{2\pi}{B}$) $y = \sin(Bx)$. $y = A \sin(Bx + C) + D$ Label the x-axis with the radian values to make the 4th mark the length of one period.

Find the period	Sine Function (parent = dotted, transformed = solid)	Shift rule(s)
$y = \sin(x) + 2$ $P = \frac{2\pi}{1} = 2\pi$		up 2 vert. shift
$y = \sin(x) - 2$ $P = \frac{2\pi}{1} = 2\pi$		vert. shift down 2
$y = 2 \sin(x)$ $P = \frac{2\pi}{1} = 2\pi$		vert. stretch by 2
$y = \frac{1}{2} \sin(x)$ $P = \frac{2\pi}{1} = 2\pi$		vert. shrink by 1/2
$y = -2 \sin(x)$ $P = \frac{2\pi}{1} = 2\pi$		vert. stretch by 2 reflection over x-axis
$y = -\frac{1}{2} \sin(x)$ $P = \frac{2\pi}{1} = 2\pi$		vert. shrink by 1/2 reflection over x-axis

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Find the period	Sine Function (parent = dotted, transformed = solid)	Shift rule(s)
$y = \sin(x + \pi/2)$ $P = \frac{2\pi}{1} = 2\pi$		horiz. shift left $\frac{\pi}{2}$
$y = \sin(x - \pi/2)$ $P = \frac{2\pi}{1} = 2\pi$		horiz. shift right $\frac{\pi}{2}$
$y = \sin(2x)$ $P = \frac{2\pi}{2} = \pi$		horiz. shrink by $\frac{1}{2}$
$y = \sin(\frac{1}{2}x)$ $P = \frac{2\pi}{1/2} = 4\pi$		horizontal stretch by 2
$2 \sin(x + \pi/2)$ $P = \frac{2\pi}{1} = 2\pi$		hor. shift left $\frac{\pi}{2}$ <hr/> vert. stretch by 2
$-\sin(x + \pi/2) - 1$ $P = \frac{2\pi}{1} = 2\pi$		hor. shift left $\frac{\pi}{2}$ <hr/> reflection over x-axis <hr/> vert. shift down 1

$y = A \sin(Bx + C) + D$ Describe the shift rules for each letter in the sine function.