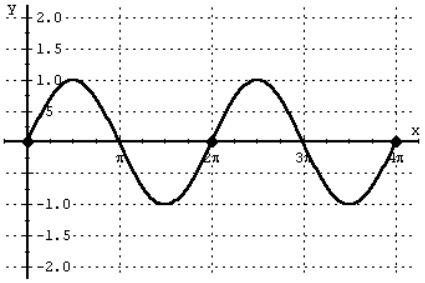
Transformations of $y = f(x) = \sin x$

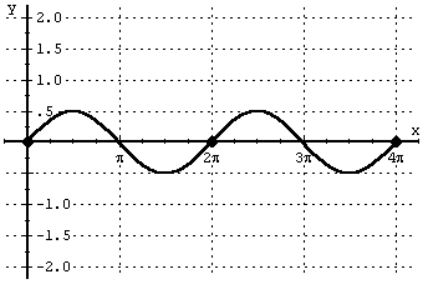


Parent Function

$y = f(x) = \sin x$

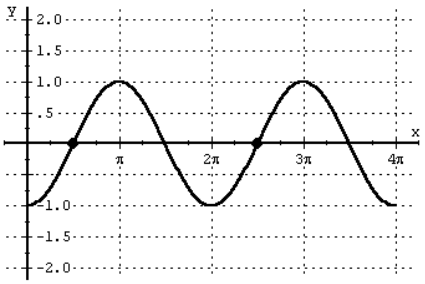
Vertical Stretch

$y = 2\,f(x) = 2\sin x$



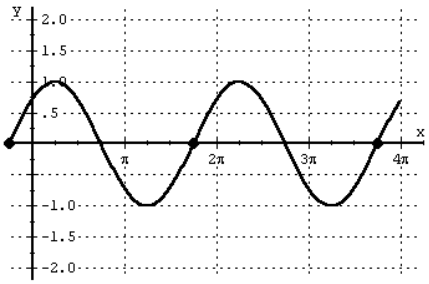
Vertical Compression

$y = \frac{1}{2} f(x) = \frac{1}{2}\sin x$



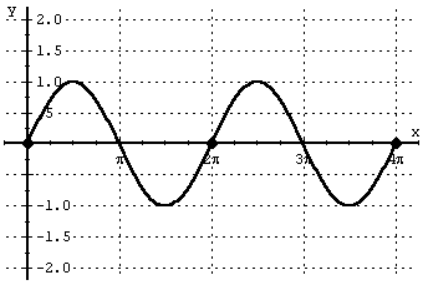
Horizontal Shift – Right $\frac{\pi}{2}$

$y = f(x - \frac{\pi}{2}) = \sin(x - \frac{\pi}{2})$



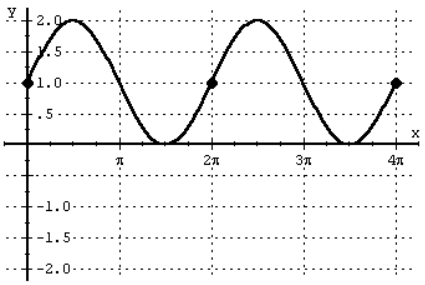
Horizontal Shift – Left $\frac{\pi}{4}$

$y = f(x + \frac{\pi}{4}) = \sin(x + \frac{\pi}{4})$



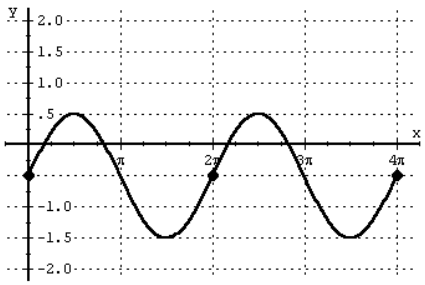
Horizontal Shift – Right 2π

$y = f(x - 2\pi) = \sin(x - 2\pi)$



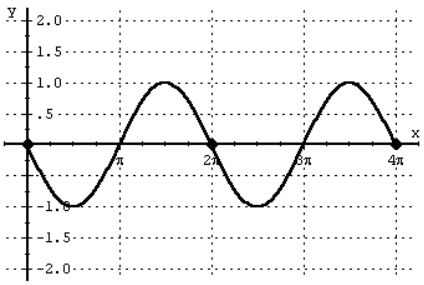
Vertical Shift – Up 1

$y = f(x) + 1 = 1 + \sin x$



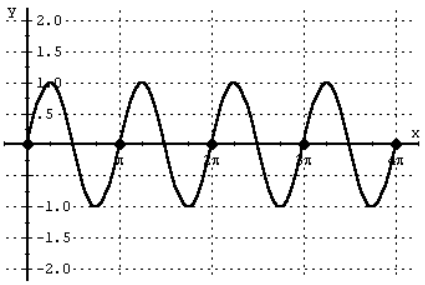
Vertical Shift – Down $\frac{1}{2}$

$y = f(x) - \frac{1}{2} = -\frac{1}{2} + \sin x$



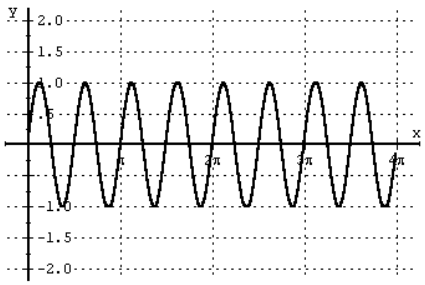
Reflection about the x-axis

$y = -f(x) = -\sin x$



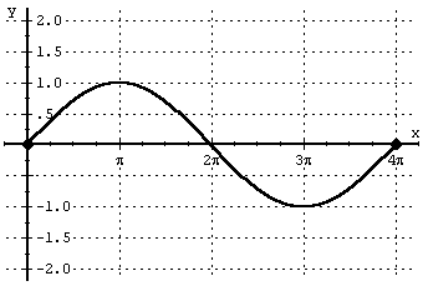
Horizontal Compression

$y = f(2x) = \sin 2x$



Horizontal Compression

$y = f(4x) = \sin 4x$



Horizontal Stretch

$y = f(\frac{1}{2}x) = \sin \frac{1}{2}x$