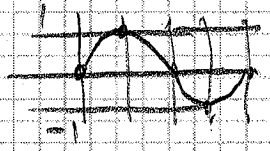
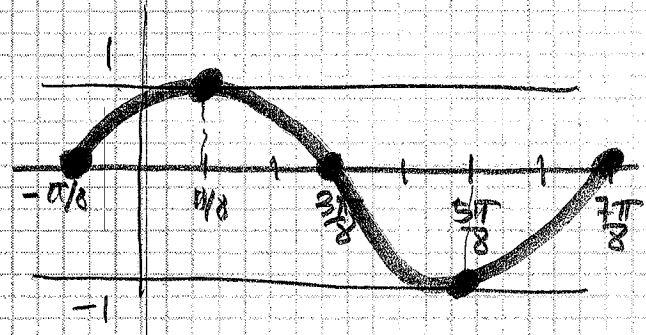
EXAMPLE OF TRANSFORMATIONS OF SINE

Graph $y = -2\sin\left(2x + \frac{\pi}{4}\right) + 3$

$y = \sin x$



x	$2x + \frac{\pi}{4}$	$\sin(2x + \pi/4)$
$-\pi/8$	0	0
$\pi/8$	$\pi/2$	1
$3\pi/8$	π	0
$5\pi/8$	$3\pi/2$	-1
	2π	0



$2x + \frac{\pi}{4} = 0 \Rightarrow 2x = -\frac{\pi}{4} \Rightarrow x = \left(-\frac{\pi}{8}\right)$ = Phase shift

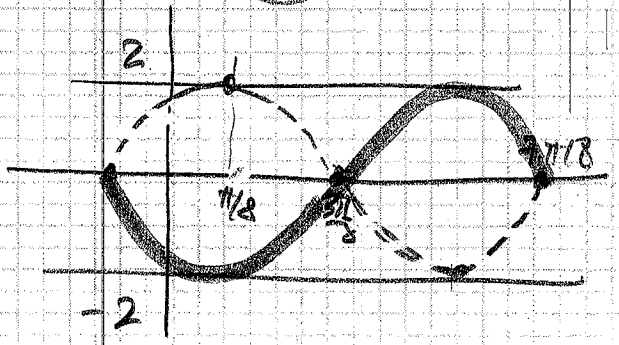
$2x + \frac{\pi}{4} = \frac{\pi}{2} \Rightarrow 2x = \frac{\pi}{2} - \frac{\pi}{4} = \frac{\pi}{4} \Rightarrow x = \left(\frac{\pi}{8}\right)$

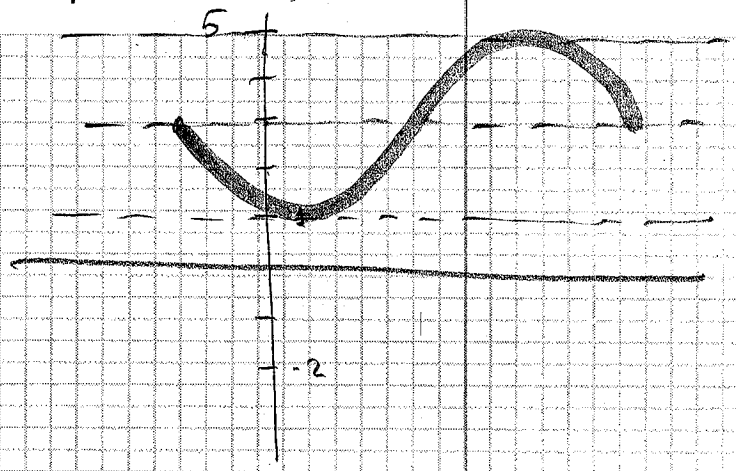
$2x + \frac{\pi}{4} = \pi \Rightarrow 2x = \pi - \frac{\pi}{4} = \frac{3\pi}{4} \Rightarrow x = \left(\frac{3\pi}{8}\right)$

$2x + \frac{\pi}{4} = \frac{3\pi}{2} \Rightarrow 2x = \frac{3\pi}{2} - \frac{\pi}{4} = \frac{5\pi}{4} \Rightarrow x = \left(\frac{5\pi}{8}\right)$

$2x + \frac{\pi}{4} = 2\pi \Rightarrow 2x = 2\pi - \frac{\pi}{4} = \frac{7\pi}{4} \Rightarrow x = \left(\frac{7\pi}{8}\right)$

$y = -2\sin(2x + \pi/4)$




5
-2