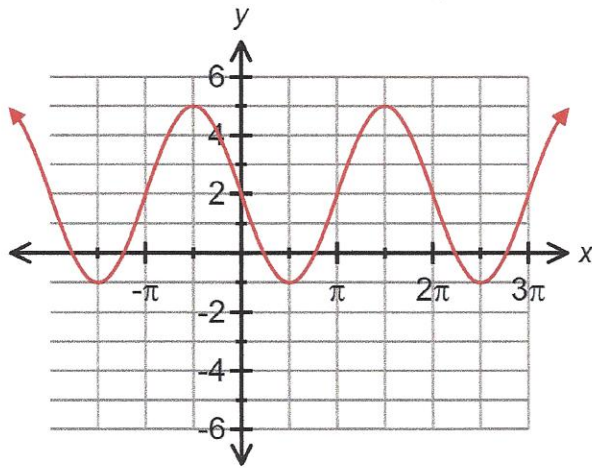


1. Sketch the graph of the following over two cycles.

a) $y = 3\cos(x + \frac{\pi}{2}) + 2$

MAX 5
min -1
SA $y = 2$

$(x, y) \rightarrow (x - \frac{\pi}{2}, 3y + 2)$



x	y
0	1 MAX
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1

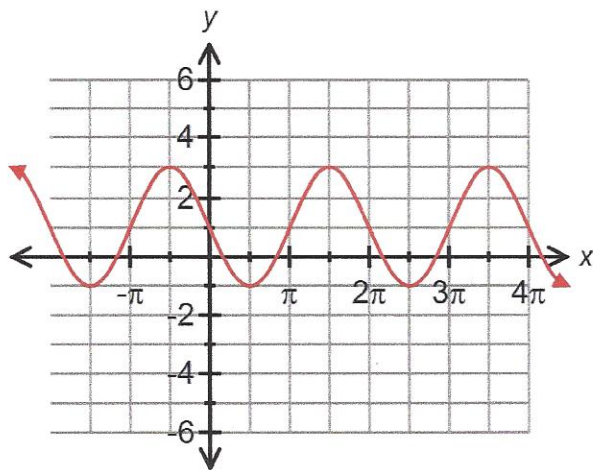
→

x	y
$-\frac{\pi}{2}$	5 MAX
0	2
$\frac{\pi}{2}$	-1
π	2
$\frac{3\pi}{2}$	5

b) $y = 2\sin(x - \pi) + 1$

MAX 3
min -1
SA $y = 1$

$(x, y) \rightarrow (x + \pi, 2y + 1)$



x	y
0	0 SA
$\frac{\pi}{2}$	1 MAX
π	0
$\frac{3\pi}{2}$	-1
2π	0

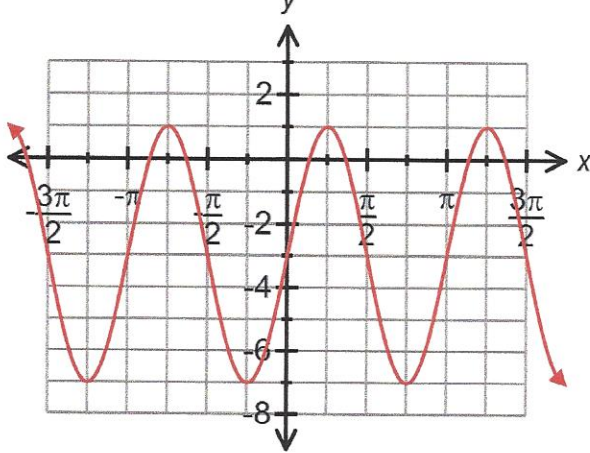
→

x	y
π	1 SA
$\frac{3\pi}{2}$	3 MAX
2π	1 SA
$\frac{5\pi}{2}$	-1 min
3π	1

reflection over x
↓

$$(x, y) \rightarrow (\frac{1}{2}x - \frac{\pi}{2}, -4y - 3)$$

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



x	y	
0	0	SA
$\frac{\pi}{2}$	1	MAX
π	0	SA
$\frac{3\pi}{2}$	-1	min
2π	0	

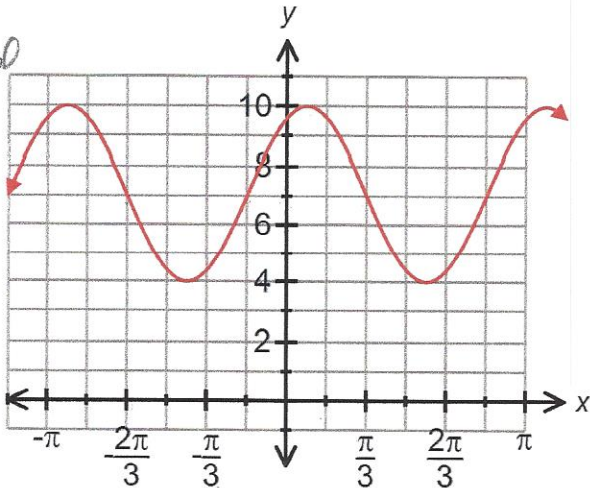
x	y	
$-\frac{\pi}{2}$	-3	SA
$-\frac{\pi}{4}$	-7	MIN
0	-3	
$\frac{\pi}{4}$	1	MAX
$\frac{\pi}{2}$	-3	

reflection over y

d) $y = 3\cos(-2(x - \frac{\pi}{6})) + 7$
 $y = 3\cos(-2(x - \frac{\pi}{12})) + 7$

$$(x, y) \rightarrow (-\frac{1}{2}x + \frac{\pi}{12}, 3y + 7)$$

same as original



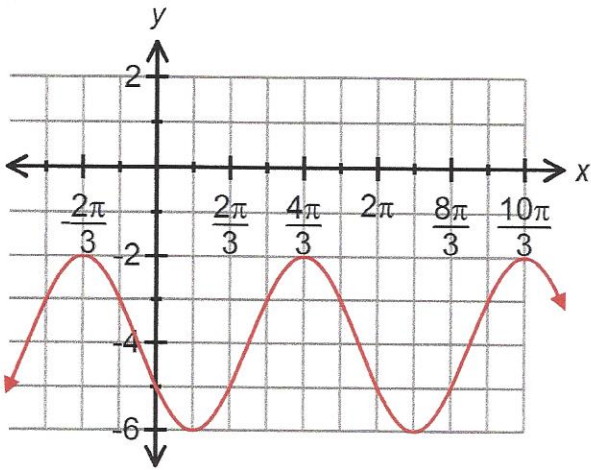
x	y	
0	1	MAX
$\frac{\pi}{2}$	0	SA
π	-1	min
$\frac{3\pi}{2}$	0	
2π	1	

x	y	
15°	$\frac{\pi}{12}$	10 MAX
	$-\frac{\pi}{6}$	7
-75°	$-\frac{5\pi}{12}$	4 MIN
	$-\frac{2\pi}{3}$	7
	$-\frac{11\pi}{12}$	10

reflection over x



e) $y = -2\cos((x - \frac{\pi}{3})) - 4$



$(x, y) \rightarrow (x + \frac{\pi}{3}, -2y - 4)$

x	y	x	y
0	1 max	$60^\circ \frac{\pi}{3}$	-6 min
$\frac{\pi}{2}$	0 SA	$150^\circ \frac{5\pi}{6}$	-4 SA
π	-1 min →	$240^\circ \frac{4\pi}{3}$	-2 max
$\frac{3\pi}{2}$	0	$\frac{11\pi}{6}$	-4
2π	1	$\frac{2\pi}{3}$	-6