

### Cosine Functions

1. Determine the amplitude, period, phase shift, and vertical shift of each function.

a)  $y = \cos 2x - 5$

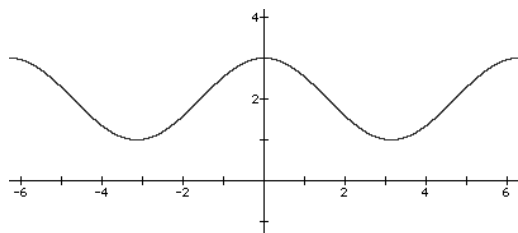
b)  $y = 2\sin(3x + 3\pi)$

c)  $y = 3\cos 0.5x + 4$

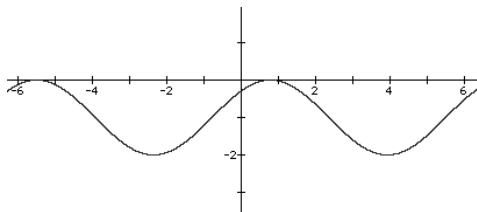
d)  $y = -\sin(x - \pi/4) - 2$

2. Determine the phase shift and vertical shift of each function. Then write an equation of each graph.

a)



b)



3. Give the phase shift and vertical shift of each function. Then sketch the graph of the function over the given interval.

a)  $y = \sin(x - \pi/2) + 1, [0, 2\pi]$

b)  $y = \cos x - 3, [-2\pi, 2\pi]$

c)  $y = \cos(x + \pi) - 2, [0, 3\pi]$