

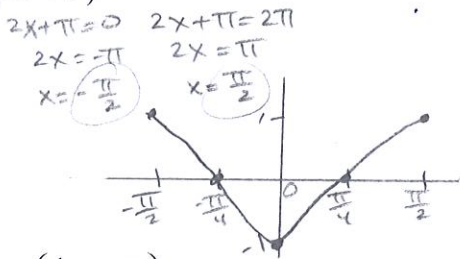
**Trig Graphing - WS 5**  
**Sine and Cosine Graphs with all Transformations**

Name Key

State the amplitude, period, phase shift and vertical shift of each of the following functions. Then graph one complete period of each function, labeling the horizontal axis and vertical axis. Also state the domain and range of one period using interval notation. \*\* Remember:  $\theta \rightarrow$  degrees and  $x \rightarrow$  radians. \*\*

1)  $y = \cos(2x + \pi)$

Amp = 1  
 Pd =  $\frac{2\pi}{2} = \pi$   
 PS =  $-\frac{\pi}{2}$   
 VS = None  
 D:  $[-\frac{\pi}{2}, \frac{\pi}{2}]$   
 R:  $[-1, 1]$



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

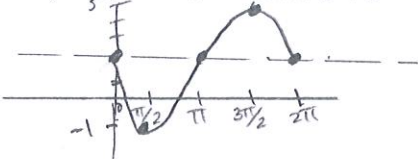
Amp =  $\frac{1}{2}$   
 Pd =  $\frac{2\pi}{1/2} = 4\pi$   
 PS =  $-\frac{\pi}{2}$   
 VS = None  
 D:  $[-\pi, 3\pi]$   
 R:  $[-\frac{1}{2}, \frac{1}{2}]$

$\frac{1}{2}x + \frac{\pi}{2} = 0 \quad \frac{1}{2}x + \frac{\pi}{2} = 2\pi$   
 $\frac{1}{2}x = -\frac{\pi}{2} \quad \frac{1}{2}x = \frac{3\pi}{2}$   
 $x = -\pi \quad x = 3\pi$



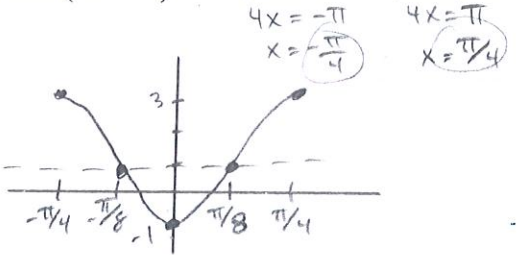
5)  $y = 3 \sin(-2x) + 2$

Amp = 3  
 Pd =  $\frac{2\pi}{2} = \pi$   
 PS = None  
 VS = 2  
 D:  $[0, \pi]$   
 R:  $[-1, 5]$



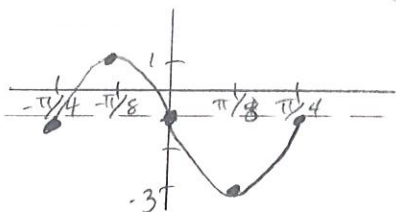
7)  $y = 2 \cos(4x + \pi) + 1$

Amp = 2  
 Pd =  $\frac{2\pi}{4} = \frac{\pi}{2}$   
 PS =  $-\frac{\pi}{4}$   
 VS = 1  
 D:  $[-\frac{\pi}{4}, \frac{\pi}{4}]$   
 R:  $[-1, 3]$



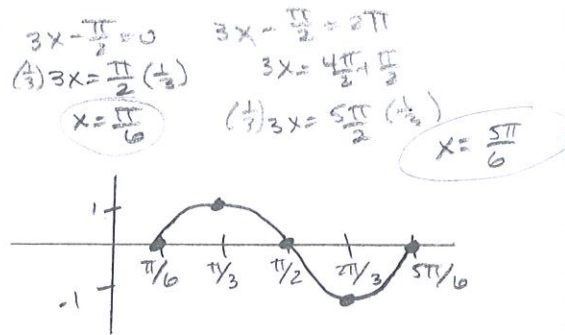
9)  $y = 2 \sin(4x + \pi) - 1$

Amp = 2  
 Pd =  $\frac{2\pi}{4} = \frac{\pi}{2}$   
 PS =  $-\frac{\pi}{4}$   
 VS = -1  
 D:  $[-\frac{\pi}{4}, \frac{\pi}{4}]$   
 R:  $[-3, 1]$



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

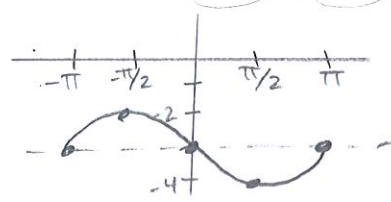
Amp = 1  
 Pd =  $\frac{2\pi}{3}$   
 PS =  $\frac{\pi}{6}$   
 VS = None  
 D:  $[\frac{\pi}{6}, \frac{5\pi}{6}]$   
 R:  $[-1, 1]$



4)  $y = -\sin(-x - \pi) - 3$

Amp = 1  
 Pd =  $\frac{2\pi}{1} = 2\pi$   
 PS =  $-\pi$   
 VS = -3  
 D:  $[-\pi, \pi]$   
 R:  $[-4, -2]$

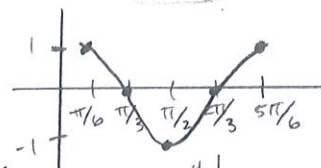
$y = \sin(x + \pi) - 3$   
 $x + \pi = 0 \quad x + \pi = 2\pi$   
 $x = -\pi \quad x = \pi$



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

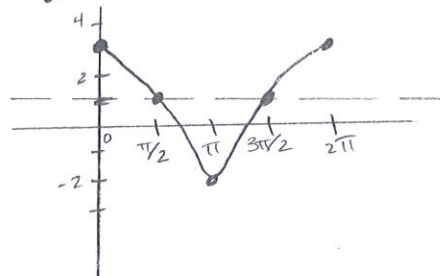
Amp = 1  
 Pd =  $\frac{2\pi}{3}$   
 PS =  $\frac{\pi}{6}$   
 VS = None  
 D:  $[\frac{\pi}{6}, \frac{5\pi}{6}]$   
 R:  $[-1, 1]$

$3x - \frac{\pi}{2} = 0 \quad 3x - \frac{\pi}{2} = 2\pi$   
 $(\frac{1}{3})3x = \frac{\pi}{2} \quad (\frac{1}{3})3x = \frac{5\pi}{2}$   
 $x = \frac{\pi}{6} \quad x = \frac{5\pi}{6}$



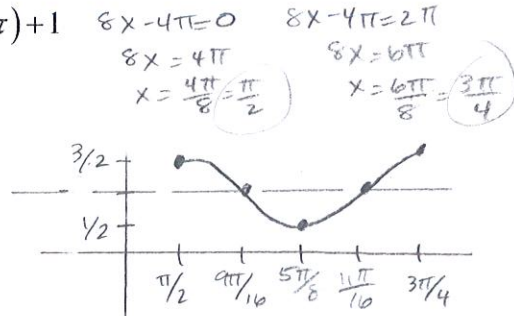
8)  $y = 3 \cos x + 1$

Amp = 3  
 Pd =  $\frac{2\pi}{1} = 2\pi$   
 PS = None  
 VS = 1  
 D:  $[0, 2\pi]$   
 R:  $[-2, 4]$



10)  $y = \frac{1}{2} \cos(8x - 4\pi) + 1$

Amp =  $\frac{1}{2}$   
 Pd =  $\frac{2\pi}{8} = \frac{\pi}{4}$   
 PS =  $\frac{\pi}{2}$   
 VS = 1  
 D:  $[\frac{\pi}{2}, \frac{3\pi}{4}]$   
 R:  $[\frac{1}{2}, \frac{3}{2}]$



$\frac{\pi}{2} + \frac{3\pi}{4} = \frac{2\pi}{4} + \frac{3\pi}{4} = \frac{5\pi}{4} \cdot \frac{1}{2} = \frac{5\pi}{8}$   
 $\frac{\pi}{2} + \frac{5\pi}{8} = \frac{4\pi}{8} + \frac{5\pi}{8} = \frac{9\pi}{8} \cdot \frac{1}{2} = \frac{9\pi}{16}$