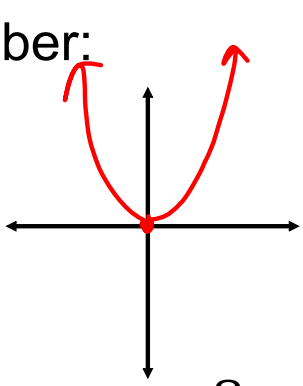
LT: Graph Vertical and Horizontal Shifts of Sine and Cosine functions.

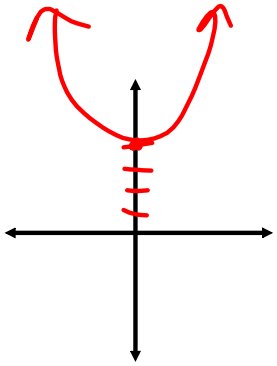
Part I: Vertical Shifts

If a number is added/subtracted to the function, it will create a vertical shift. (Just like with any other function)

Remember:



$f(x) = x^2$



$f(x) = x^2 + 4$

Ex 1) Graph $f(x) = |\cos(x)| + 3$

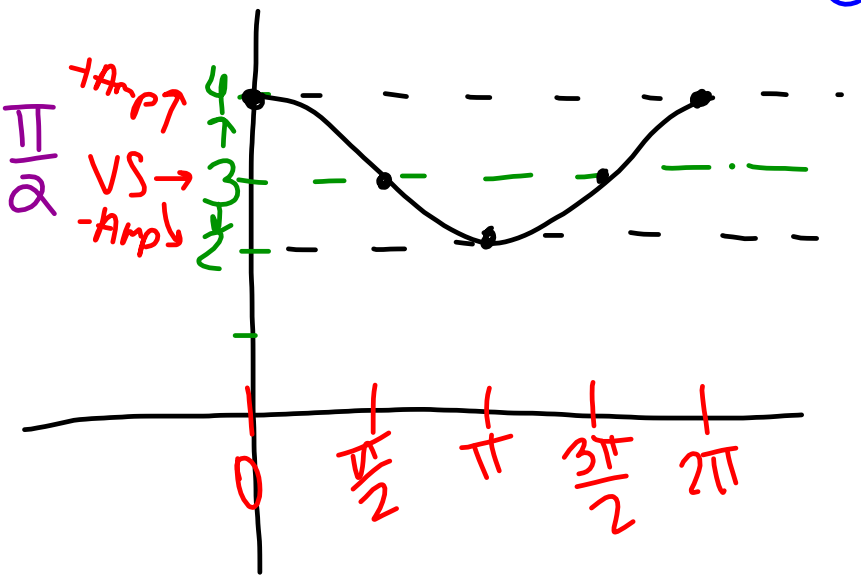
Amp: 1

Per: 2π

Int: $\frac{2\pi}{4} = \frac{\pi}{2}$

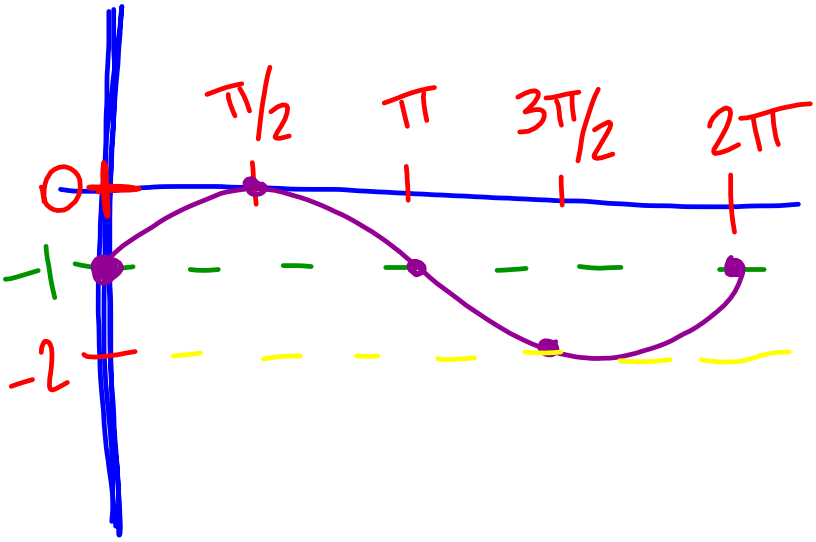
VS: +3

$0 + \frac{\pi}{2} = \frac{\pi}{2} + \frac{\pi}{2} = \frac{2\pi}{2} + \frac{\pi}{2} = \frac{3\pi}{2}$ $\frac{4\pi}{2}$



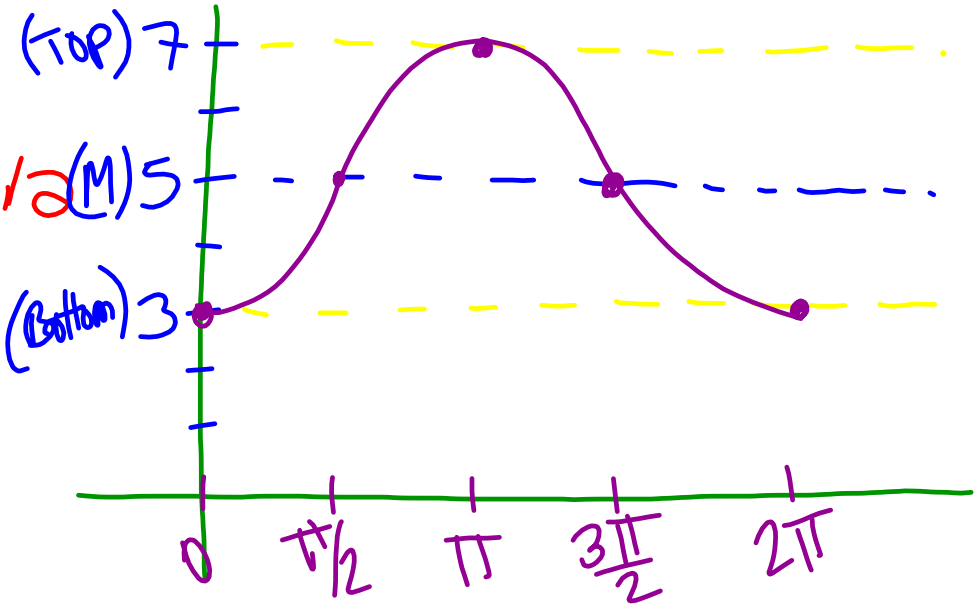
Ex 2) Graph f(x) = sin(x) - 1

Amp: 1
Per: 2π
Int: $\frac{\pi}{2}$
VS: -1



Ex 3) Graph f(x) = -2cos(x) + 5

Amp: 2
Per: 2π
Int: $\pi/2$
VS: +5
*Neg



Ex 4) Graph f(x) = 3sin(3x) - 3

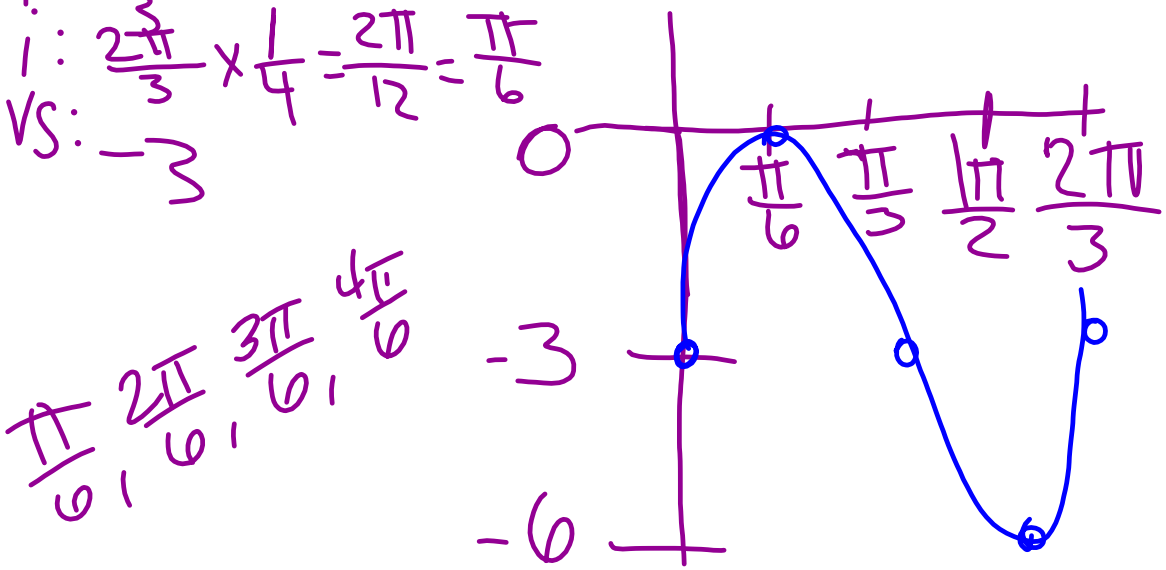
a: 3

P: $\frac{2\pi}{3}$

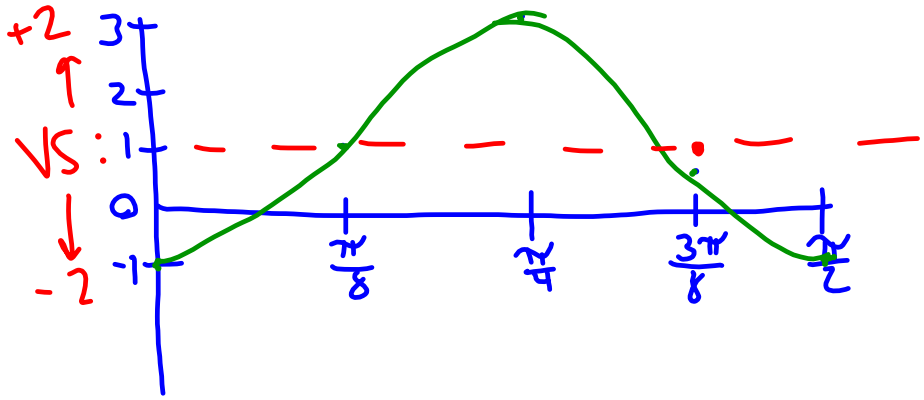
i: $\frac{2\pi}{3} \times \frac{1}{4} = \frac{2\pi}{12} = \frac{\pi}{6}$

VS: -3

$\frac{\pi}{6}, \frac{2\pi}{6}, \frac{3\pi}{6}, \frac{4\pi}{6}$



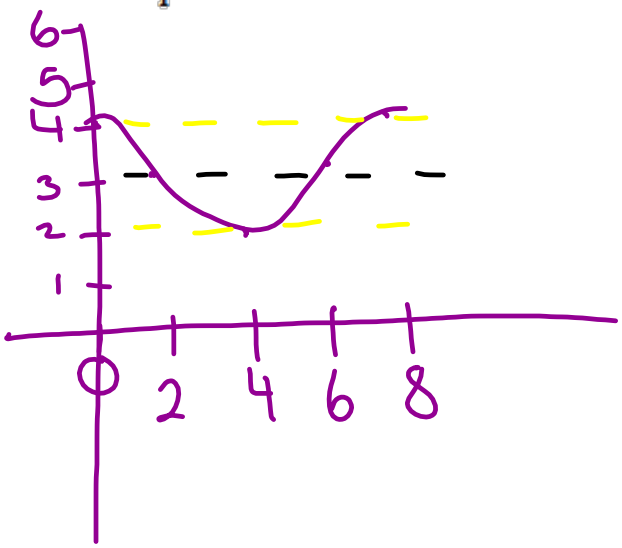
Ex 5) Graph f(x) = -2cos(4x) + 1



Ex 6) Graph $f(x) = cos\left(\frac{\pi}{4}x\right) + 3$

Amp: 1
Per: 8

Int: 2
VS: +3



Ex 7) Graph $f(x) = -5sin\left(\frac{3}{2}x\right) + 1$

Per: $2\pi \cdot \frac{2}{3}$
$\frac{4\pi}{3}$..