

Dilation Notes

Graph

$$y = a \sin(b(x-c)) + d \quad \text{OR} \quad y = a \cos(b(x-c)) + d$$

$a \rightarrow$ vertical dilation, the amplitude tells how far the min & max are from the midline

$b \rightarrow$ the horizontal dilation

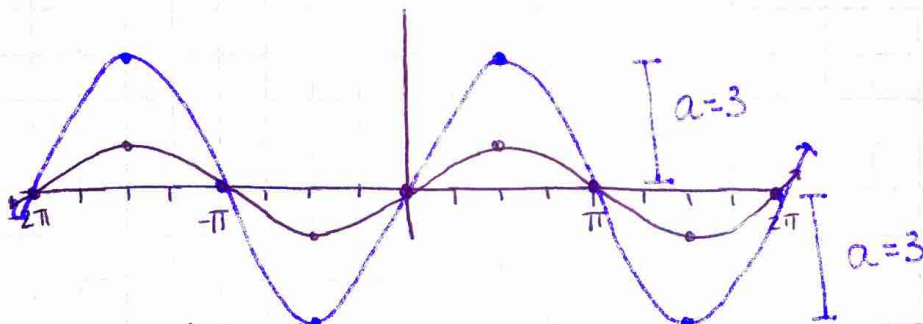
$$\frac{2\pi}{b} = \text{period} \quad \text{OR} \quad \frac{360}{b} = \text{period}$$

$c \rightarrow$ the phase shift, left/right movement
* opposite

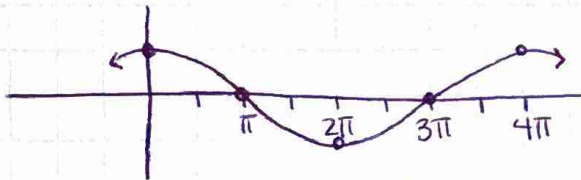
$d \rightarrow$ the midline shift, up/down movement

examples

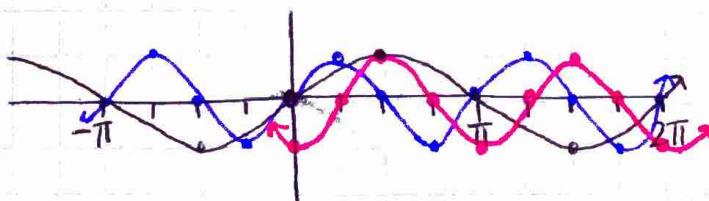
$y = 3 \sin x$ ~~PF: $\sin x$~~ $a=3$



$y = \cos(1/2 x)$ PF: $\cos x$ $b=1/2$ period = $\frac{2\pi}{1/2} = 4\pi$ key points $\frac{4\pi}{4} = \pi$



$y = \sin(2(x-45^\circ))$ $b=2$ $c=45^\circ$ R45°
 $\frac{2\pi}{2} = \pi$ K.P. $\frac{\pi}{4}$



\equiv parent function
 \equiv period
 \Rightarrow final