## Chapter 6 - Sinusoidal Functions

## 6.5 – Sketching Sinusoidal Functions

By this point in your illustrious High School careers, you have a solid understanding of Transformations of Functions in general. In terms of the sinusoidal functions Sine and Cosine in particular, the concepts are as you expect, but the transformations have specific meanings relating to nature of the sinusoidal "wave".

## General Form of the Sine and Cosine Functions

$$f(\theta) = a \sin(k(\theta - d)) + c \qquad g(\theta) = a \cos(k(\theta - d)) + c$$

$$\downarrow \qquad \downarrow \qquad \downarrow$$

$$|a| = \operatorname{amplitude} \qquad a = \frac{\max - \min}{2}$$

$$(\operatorname{verhis}(\operatorname{shretch}))$$

 $d = \begin{array}{l} h \ge 1 \\ h \ge$ 

Period =  $\frac{360}{k}$  =  $\frac{360}{p}$ 

factor le out of le "angle!



Example 6.5.1 Determine the amplitude, period, phase shift and the equation of the central axis for: 1:2 a)  $f(\theta) = 2\sin(\theta + 60^\circ) + 1$ b)  $g(\theta) = 3\cos(2\theta - 90^\circ)$  $= 3 \cos\left(2(\theta - 45^{\circ})\right)$  $a \ge 2$ Revised =  $\frac{365}{L} = 365^{\circ}$ C.A.: y=1 a=3 k=2 => P= 360 = 360 = 180° those Shift: Leo left Phase Shift 41° right C.A. y=0 Example 6.5.2 9(2) P= Sketch  $f(x) = \sin(x)$  and  $g(x) = \sin(2x)$  for  $0^{\circ} \le x \le 360^{\circ}$  on the same set of axes. 3602 (m)= S10 (2x gin= Sin 315 ax 135 225 27 Peside 'V /k=3

Notes about Domain and Range: Consider the function 
$$f(x) = -2\cos(3x+90^\circ)+3$$
.

Determine all the transformations for this function. Without graphing, determine the range of the function. Determine the domain of the function for: 1 cycle; 2 cycles; 3 cycles.

$$f(\pi) = -2 \cos\left(3(\pi + 35^{\circ})\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$C_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) \in \mathbb{R}\right) = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$C_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$C_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$C_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$C_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$C_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{56^{\circ}}{5} - 120$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{1}{2}(\pi) + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} - \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text{eff}} = \frac{1}{2} \left(\frac{\pi}{L} + \frac{1}{2}(\pi)\right) + 3 \qquad \alpha = 2 \qquad \text{Period}: \frac{\pi}{L} + \frac{1}{2}(\pi)$$

$$P_{\text$$

21-

98

