

3.3 Video Worksheet

Name: KEY

1.) (2 pts.) State the amplitude, period, and phase shift for $y = -\frac{1}{2} \sin\left(3x + \frac{\pi}{6}\right)$

$$|A| = \left|-\frac{1}{2}\right| = \frac{1}{2} = \text{amplitude}$$

$$\frac{2\pi}{3} = \text{period}$$

$$-\frac{\left(\frac{\pi}{6}\right)}{\frac{3}{1}} = \frac{-\pi}{6} \cdot \frac{1}{3} = \frac{-\pi}{18} = \text{phase shift}$$

2.) (8 pts.) Sketch the graph of $y = 6 - 4 \cos\left(4x + \frac{\pi}{2}\right)$ on the interval $-\frac{\pi}{2} \leq x \leq \pi$ by completing each of the following steps on the same graph. Clearly label which graph belongs to each step.

(a.) Graph $y = \cos(4x)$. \Rightarrow period = $\frac{2\pi}{4} = \frac{\pi}{2}$

(b.) Graph $y = \cos\left(4x + \frac{\pi}{2}\right)$ \Rightarrow phase shift = $\frac{-\frac{\pi}{2}}{4} = \frac{-\pi}{8} \cdot \frac{1}{4} = \frac{-\pi}{8}$ to left

(c.) Graph $y = -4 \cos\left(4x + \frac{\pi}{2}\right)$. (Note that this is the graph of $4 \cos\left(4x + \frac{\pi}{2}\right)$ reflected about the x -axis) \leftarrow reflection then vertical stretch by 4

(d.) Graph $y = 6 - 4 \cos\left(4x + \frac{\pi}{2}\right)$ \leftarrow shift vertically up 6

