

4.4 Writing Sinusoidal Functions (Target 5E)

Graph	Key Features	Equation
	Amplitude: <u>2</u> * $a=2$ $\frac{2\pi}{ b } = 4\pi$ $2\pi = 4\pi b$ $\frac{1}{2} = b$ * Period: <u>4π</u> graph @ $(0,0)$ Phase Shift: <u>none</u> $\frac{c}{b} = 0$ $c = 0$ * Vertical Shift: <u>none</u> $d=0$	Sine Equation $y = a \sin(bx+c) + d$ $y = 2 \sin(\frac{1}{2}x+0) + 0$ $y = 2 \sin(\frac{1}{2}x)$
	Amplitude: <u>2</u> * $a=2$ $\frac{2\pi}{ b } = 4\pi$ $2\pi = 4\pi b$ $\frac{1}{2} = b$ * $\frac{c}{b} = \pi$ $c = \pi/2$ * Period: <u>4π</u> Phase Shift: <u>π</u> (to the right) Vertical Shift: <u>none</u> $d=0$	Cosine Equation $y = a \cos(bx+c) + d$ $y = 2 \cos(\frac{1}{2}x + \frac{\pi}{2}) + 0$ $y = 2 \cos(\frac{1}{2}x + \frac{\pi}{2})$

	Amplitude: <u>3</u> * $a=3$ $\frac{2\pi}{ b } = \pi$ $2\pi = \pi b$ $2 = b$ * $\frac{c}{b} = \frac{3\pi}{4}$ or $\frac{c}{2} = \frac{3\pi}{4}$ $c = \frac{3\pi}{2}$ or $c = \frac{\pi}{2}$ * Period: <u>π</u> Phase Shift: <u>$\frac{3\pi}{4}$</u> (to the right) or $\frac{\pi}{4}$ (to the left) Vertical Shift: <u>none</u> $d=0$	Sine Equation $y = 3 \sin(2x - \frac{3\pi}{2})$ or $y = 3 \sin(2x + \frac{\pi}{2})$
	Amplitude: <u>3</u> * $a=3$ $\frac{2\pi}{ b } = \pi$ $2\pi = \pi b$ $2 = b$ * Period: <u>π</u> graph @ $(0,3)$ $\frac{c}{b} = 0$ $c = 0$ * Phase Shift: <u>none</u> Vertical Shift: <u>none</u> $d=0$	Cosine Equation $y = 3 \cos(2x)$

Graph	Key Features	Equation
	<p>Amplitude: <u>3</u> * $a=3$</p> <p>$\frac{2\pi}{ b } = 2\pi$ $2\pi = 2\pi b$ $1 = b$ *</p> <p>Period: <u>2π</u></p> <p>graph @ $(0, 1)$ $c=0$</p> <p>Phase Shift: <u>none</u></p> <p>Vertical Shift: <u>1 (up)</u> $d=1$</p>	<p>Sine Equation</p> <p>$y = 3 \sin(x) + 1$</p>
	<p>Amplitude: <u>3</u> * $a=3$</p> <p>$\frac{2\pi}{ b } = 2\pi$ $2\pi = 2\pi b$ $1 = b$ *</p> <p>Period: <u>2π</u></p> <p>$c_1 = \pi/2$ $c = \pi/2$ *</p> <p>Phase Shift: <u>$\pi/2$ (to the right)</u></p> <p>Vertical Shift: <u>1 (up)</u> $d=1$</p>	<p>Cosine Equation</p> <p>$y = 3 \cos(x - \frac{\pi}{2}) + 1$</p>

	<p>Amplitude: <u>1.5</u> * $a=1.5$ reflect over x-axis</p> <p>$\frac{2\pi}{b} = 4\pi$ $2\pi = 4\pi b$ $\frac{1}{2} = b$ *</p> <p>Period: <u>4π</u></p> <p>graph @ $(0, 3)$</p> <p>Phase Shift: <u>none</u></p> <p>Vertical Shift: <u>3</u></p>	<p>Sine Equation</p> <p>$y = -1.5 \sin(\frac{1}{2}x) + 3$</p>
	<p>Amplitude: <u>1.5</u> * $a=1.5$ reflect over x-axis</p> <p>$\frac{2\pi}{b} = 4\pi$ $2\pi = 4\pi b$ $\frac{1}{2} = b$ *</p> <p>Period: <u>4π</u></p> <p>$c_1 = \pi$ $c = \pi/2$ *</p> <p>Phase Shift: <u>π (to the right)</u></p> <p>Vertical Shift: <u>3</u></p>	<p>Cosine Equation</p> <p>$y = -1.5 \cos(\frac{1}{2}x - \frac{\pi}{2}) + 3$</p>