

State the amplitude, period, phase shift and vertical shift for each of the following.

1. $y = -3 \sin(x + \frac{\pi}{3}) - 2$ $\frac{P}{4} = (\frac{\pi}{2})$

Amplitude: <u>3</u>	Period: <u>2π</u>	Phase Shift: <u>$-\frac{\pi}{3}$</u>	Vertical Shift: <u>-2</u>
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Key Points:

$(-\frac{\pi}{3}, -2)$ $(\frac{\pi}{6}, -5)$ $(\frac{2\pi}{3}, -2)$ $(\frac{7\pi}{6}, 1)$ $(\frac{5\pi}{3}, -2)$

2. $y = 4 \sin(\frac{\pi}{2}x + \frac{\pi}{4}) + 1$ $\frac{P}{4} = 1$

Amplitude: <u>4</u>	Period: <u>4</u>	Phase Shift: <u>$-\frac{1}{2}$</u>	Vertical Shift: <u>1</u>
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Key Points:

$(-\frac{1}{2}, 1)$ $(\frac{1}{2}, 5)$ $(\frac{3}{2}, 1)$ $(\frac{5}{2}, -3)$ $(\frac{7}{2}, 1)$

3. $y = \frac{1}{3} \sin(\pi x + 2) - 4$ $\frac{P}{4} = \frac{2}{4} = \frac{1}{2}$

Amplitude: <u>$\frac{1}{3}$</u>	Period: <u>2</u>	Phase Shift: <u>$-\frac{2}{\pi}$</u>	Vertical Shift: <u>-4</u>
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Key Points:

$(-\frac{2}{\pi}, -4)$ $(-\frac{2}{\pi} + \frac{1}{2}, -\frac{11}{3})$ $(-\frac{2}{\pi} + 1, -4)$ $(-\frac{2}{\pi} + \frac{3}{2}, -\frac{13}{3})$ $(-\frac{2}{\pi} + 2, -4)$

Write a sine function for each of the following.

4. Amplitude = 2	Period = 3π	Phase Shift = 0	Vertical Shift = 2
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$3\pi = \frac{2\pi}{b}$
 $b = \frac{2}{3}$
 $0 = -\frac{c}{\frac{2}{3}}$
 $c = 0$

$y = 2 \pm 2 \sin(\frac{3}{2}x + 0)$

5. Amplitude = $\frac{1}{2}$	Period = $\frac{\pi}{6}$	Phase Shift = $\frac{\pi}{3}$	Vertical Shift = -4
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$\frac{\pi}{6} = \frac{2\pi}{b}$
 $\pi b = 12\pi$
 $b = 12$
 $-\frac{c}{12} = \frac{\pi}{3}$
 $-3c = 12\pi$
 $c = -4\pi$

$y = -4 \pm \frac{1}{2} \sin(12x - 4\pi)$

6. Amplitude = 4	Period = 4	Phase Shift = -2	Vertical Shift = 1
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$4 = \frac{2\pi}{b}$
 $b = \frac{\pi}{2}$
 $-\frac{c}{\frac{\pi}{2}} = -2$
 $c = \pi$

$y = 1 \pm 4 \sin(\frac{\pi}{2}x + \pi)$

7. Amplitude = $\frac{1}{4}$	Period = $\frac{\pi}{4}$	Phase Shift = $\frac{\pi}{6}$	Vertical Shift = 3
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$\frac{\pi}{4} = \frac{2\pi}{b}$
 $b = \frac{\pi}{2}$
 $8\pi = \frac{c}{\frac{\pi}{2}}$
 $c = 8\pi$
 $-\frac{c}{8} = \frac{\pi}{6}$
 $-6c = 8\pi$
 $c = -\frac{4\pi}{3}$

$y = 3 \pm \frac{1}{4} \sin(8x - \frac{4\pi}{3})$

Write a cosine function for each of the following.

8. Amplitude = $\frac{1}{4}$	Period = 2π	Phase Shift = $\frac{\pi}{3}$	Vertical Shift = 2
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$2\pi = \frac{2\pi}{b}$
 $b = 1$
 $-\frac{c}{1} = \frac{\pi}{3}$
 $-3c = \pi$
 $c = -\frac{\pi}{3}$

$y = 2 \pm \frac{1}{4} \cos(x - \frac{\pi}{3})$