Answer Key · Lesson 4.4: Phase Shift and Vertical Shift

School Launch · Trigonometry · Unit 4 · Worksheet A · for the parent

Key

1. amplitude 2; period 4π; shift $\frac{\pi}{4}$ right; midline $y = -3$

For $y = 2\cos\left(\frac{1}{2}\left(x - \frac{\pi}{4}\right)\right) - 3$, give the amplitude, period, phase shift and midline.

2. amplitude 5; period $\frac{2\pi}{3}$; shift $\frac{\pi}{3}$ right; midline $y = -3$

For $y = 5\sin\left(3\left(x - \frac{\pi}{3}\right)\right) - 3$, give the amplitude, period, phase shift and midline.

3. amplitude 3; period 2π; shift $\frac{\pi}{6}$ right; midline $y = 1$

For $y = 3\sin\left(\left(x - \frac{\pi}{6}\right)\right) + 1$, give the amplitude, period, phase shift and midline.

4. amplitude 2; period π; shift $\frac{\pi}{3}$ right; midline $y = 1$

1. Amplitude $= |2| = 2$
2. Period $= \dfrac{2\pi}{2} = \pi$
3. Phase shift: $x - \dfrac{\pi}{3}$ inside → $\dfrac{\pi}{3}$ right
4. Midline $y = 1$ (the vertical shift)

For $y = 2\sin\left(2\left(x - \frac{\pi}{3}\right)\right) + 1$, give the amplitude, period, phase shift and midline.

5. amplitude 1; period 2π; shift $\frac{\pi}{2}$ right; midline $y = 4$

1. Amplitude $= |1| = 1$
2. Period $= \dfrac{2\pi}{1} = 2\pi$
3. Phase shift: $x - \dfrac{\pi}{2}$ inside → $\dfrac{\pi}{2}$ right
4. Midline $y = 4$ (the vertical shift)

For $y = \sin\left(\left(x - \frac{\pi}{2}\right)\right) + 4$, give the amplitude, period, phase shift and midline.

6. amplitude 4; period $\frac{2\pi}{3}$; shift $\frac{\pi}{6}$ right; midline $y = 0$

1. Amplitude $= |4| = 4$
2. Period $= \dfrac{2\pi}{3} = \dfrac{2\pi}{3}$
3. Phase shift: $x - \dfrac{\pi}{6}$ inside → $\dfrac{\pi}{6}$ right
4. Midline $y = 0$ (the vertical shift)

For $y = 4\cos\left(3\left(x - \frac{\pi}{6}\right)\right)$, give the amplitude, period, phase shift and midline.

7. amplitude 2; period $\frac{\pi}{2}$; shift $\frac{\pi}{3}$ right; midline $y = -4$

1. Amplitude $= |2| = 2$
2. Period $= \dfrac{2\pi}{4} = \dfrac{\pi}{2}$
3. Phase shift: $x - \dfrac{\pi}{3}$ inside → $\dfrac{\pi}{3}$ right
4. Midline $y = -4$ (the vertical shift)

For $y = 2\cos\left(4\left(x - \frac{\pi}{3}\right)\right) - 4$, give the amplitude, period, phase shift and midline.

8. amplitude 2; period π; shift $\frac{\pi}{4}$ right; midline $y = -4$

1. Amplitude $= |2| = 2$
2. Period $= \dfrac{2\pi}{2} = \pi$
3. Phase shift: $x - \dfrac{\pi}{4}$ inside → $\dfrac{\pi}{4}$ right
4. Midline $y = -4$ (the vertical shift)

For $y = 2\sin\left(2\left(x - \frac{\pi}{4}\right)\right) - 4$, give the amplitude, period, phase shift and midline.

9. amplitude 6; period $\frac{\pi}{2}$; shift $\frac{\pi}{4}$ right; midline $y = 0$

1. Amplitude $= |6| = 6$
2. Period $= \dfrac{2\pi}{4} = \dfrac{\pi}{2}$
3. Phase shift: $x - \dfrac{\pi}{4}$ inside → $\dfrac{\pi}{4}$ right
4. Midline $y = 0$ (the vertical shift)

For $y = 6\cos\left(4\left(x - \frac{\pi}{4}\right)\right)$, give the amplitude, period, phase shift and midline.

10. amplitude 3; period $\frac{\pi}{2}$; shift $\frac{\pi}{4}$ right; midline $y = 0$

1. Amplitude $= |3| = 3$
2. Period $= \dfrac{2\pi}{4} = \dfrac{\pi}{2}$
3. Phase shift: $x - \dfrac{\pi}{4}$ inside → $\dfrac{\pi}{4}$ right
4. Midline $y = 0$ (the vertical shift)

For $y = 3\sin\left(4\left(x - \frac{\pi}{4}\right)\right)$, give the amplitude, period, phase shift and midline.