

Unit 3

Find the amplitude, period, vertical shift and phase shift. **WRITE THE DIRECTION OF THE SHIFTS.**

$$1. \quad y = -4 \cos\left(4x + \frac{\pi}{2}\right) + 3$$

Amplitude: $|-4| = 4$

Period: $\frac{2\pi}{4} = \frac{\pi}{2}$

Phase Shift: $\frac{-\frac{\pi}{2}}{4} = -\frac{\pi}{8} = \text{Left } \frac{\pi}{8}$

Vertical Shift: Up 3

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

Amplitude: $\left|\frac{1}{4}\right| = \frac{1}{4}$

Period: $\frac{2\pi}{\pi} = 2$

Phase Shift: None

Vertical Shift: Down 2

$$3. \quad y = 2 - 3 \cos\left(\frac{x}{2} - 4\right) = -3 \cos\left(\frac{x}{2} - 4\right) + 2$$

Amplitude: $|-3| = 3$

Period: $\frac{2\pi}{\frac{1}{2}} = \frac{2\pi}{1} \times \frac{2}{1} = 4\pi$

Phase Shift: $\frac{4}{\frac{1}{2}} = \frac{4}{1} \times \frac{2}{1} = \text{Right } 8$

Vertical Shift: Up 2

$$4. \quad y = 6 \sin\left(x + \frac{\pi}{4}\right) - 5$$

Amplitude: $|6| = 6$

Period: $\frac{2\pi}{1} = 2\pi$

Phase Shift: $\frac{\frac{\pi}{4}}{1} = \frac{\pi}{4} = \text{Left } \frac{\pi}{4}$

Vertical Shift: Down 5

$$5. \quad y = 5 \sin\left(\frac{\pi}{10}x + \frac{\pi}{10}\right) + 4$$

Amplitude: $|5| = 5$

Period: $\frac{2\pi}{\frac{\pi}{10}} = \frac{2\pi}{1} \times \frac{10}{\pi} = 20$

Phase Shift: $\frac{\frac{\pi}{10}}{\frac{\pi}{10}} = \frac{\pi}{10} \times \frac{10}{\pi} = \text{Left } 1$

Vertical Shift: Up 4

6.

$$y = -2 + \frac{1}{8} \sin\left(\frac{x}{4} + \pi\right) = \frac{1}{8} \sin\left(\frac{x}{4} + \pi\right) - 2$$

Amplitude: $\left|\frac{1}{8}\right| = \frac{1}{8}$

Period: $\frac{2\pi}{\frac{1}{4}} = \frac{2\pi}{1} \times \frac{4}{1} = 8\pi$

Phase Shift: $\frac{-\pi}{\frac{1}{4}} = \frac{-\pi}{1} \times \frac{4}{1} = \text{Left } 4\pi$

Vertical Shift: Down 2

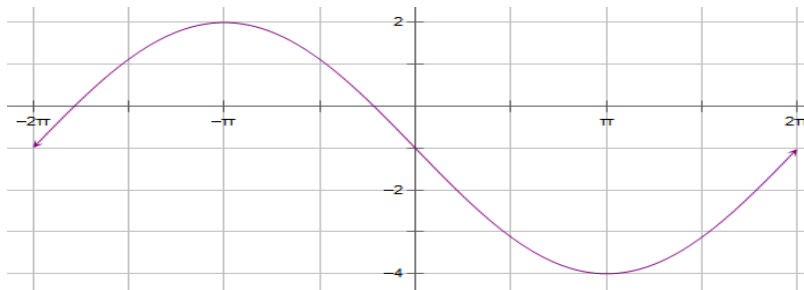
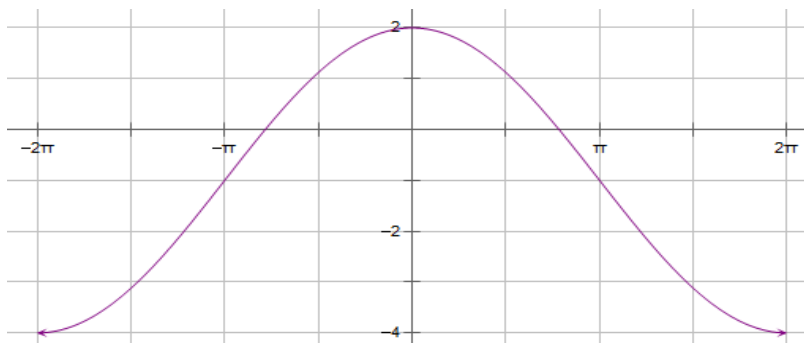
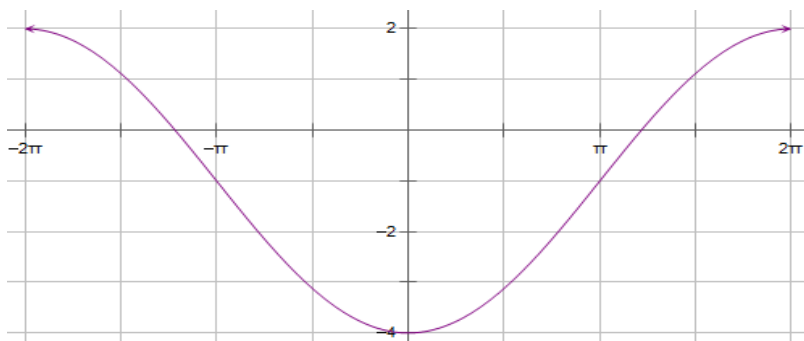
Match the graph with the correct equation. Write the LETTER of the graph on the line provided next to the correct equation.

7. $y = -3\sin\left(\frac{x}{2} + \frac{\pi}{2}\right) - 1$ **D**

8. $y = 3\sin\left(\frac{x}{2} + \frac{\pi}{2}\right) - 1$ **B**

9. $y = -3\cos\left(\frac{x}{2} + \frac{\pi}{2}\right) - 1$ **C**

10. $y = 3\cos\left(\frac{x}{2} + \frac{\pi}{2}\right) - 1$ **A**

A.**B.****C.****D.**

Match the graph with the correct equation. Write the LETTER of the graph on the line provided next to the correct equation.

11. $y = 2\cos\left(2x - \frac{\pi}{4}\right) - 2$ **A**

12. $y = -2\cos\left(2x - \frac{\pi}{4}\right) - 2$ **B**

13. $y = 2\cos\left(2x - \frac{\pi}{2}\right) - 2$ **D**

14. $y = -2\cos\left(2x - \frac{\pi}{2}\right) - 2$ **C**

A.



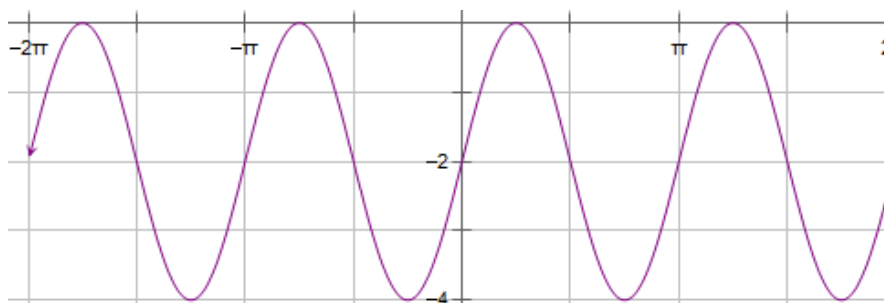
B.



C.

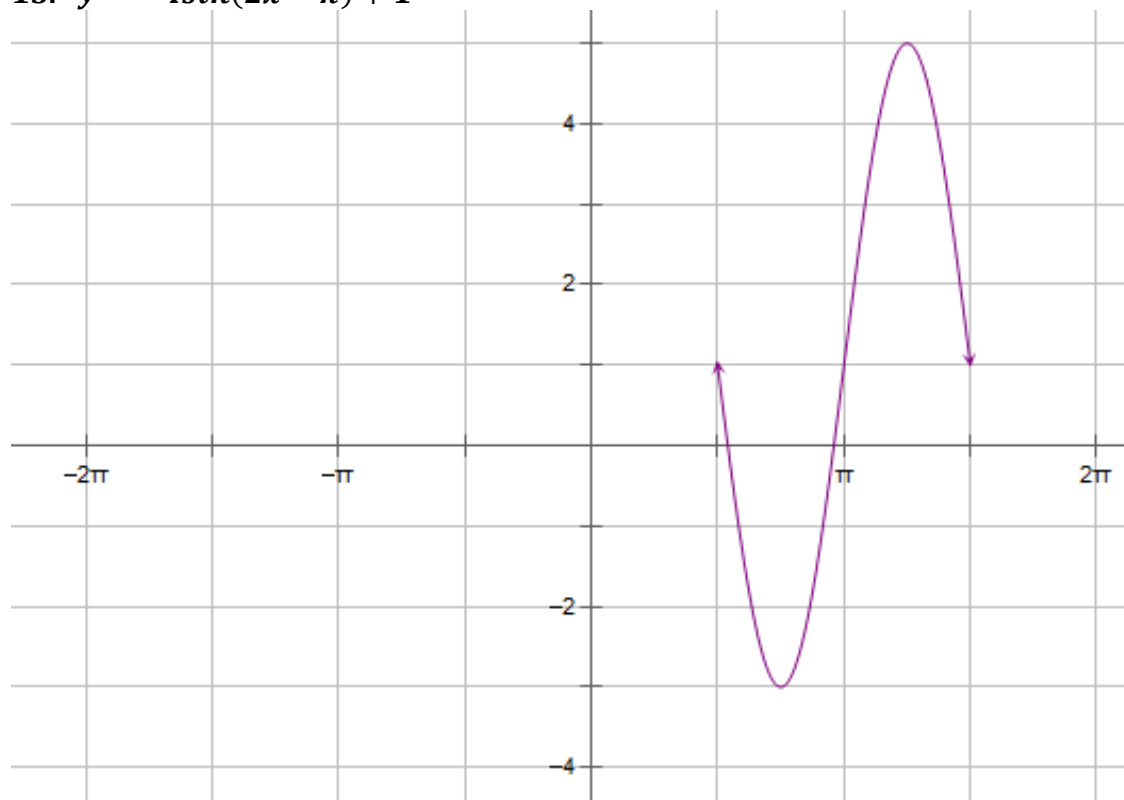


D.

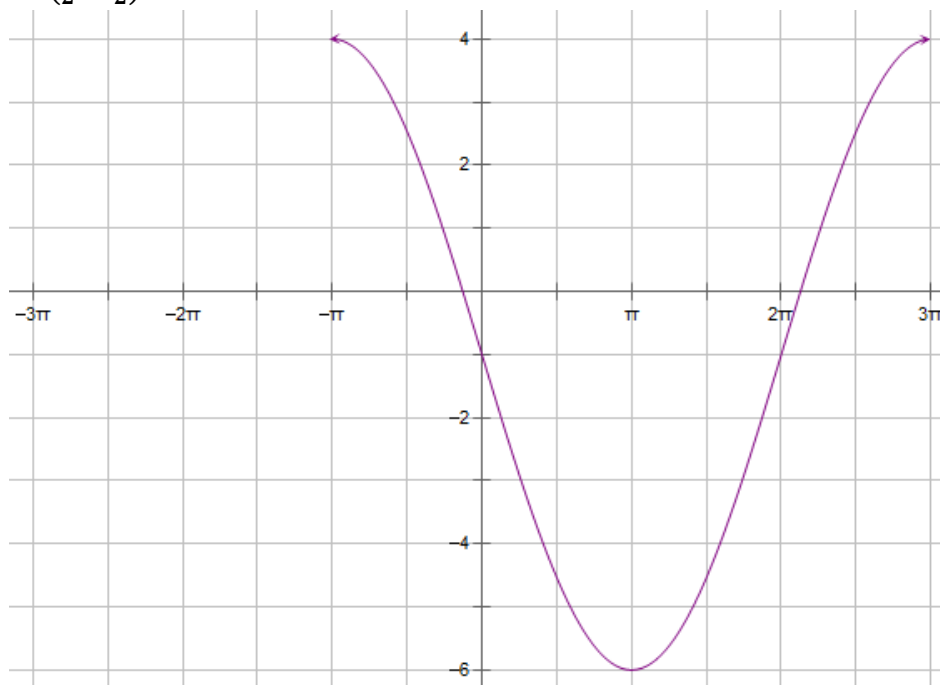


Graph AT LEAST ONE FULL period of the following functions.

15. $y = -4\sin(2x - \pi) + 1$

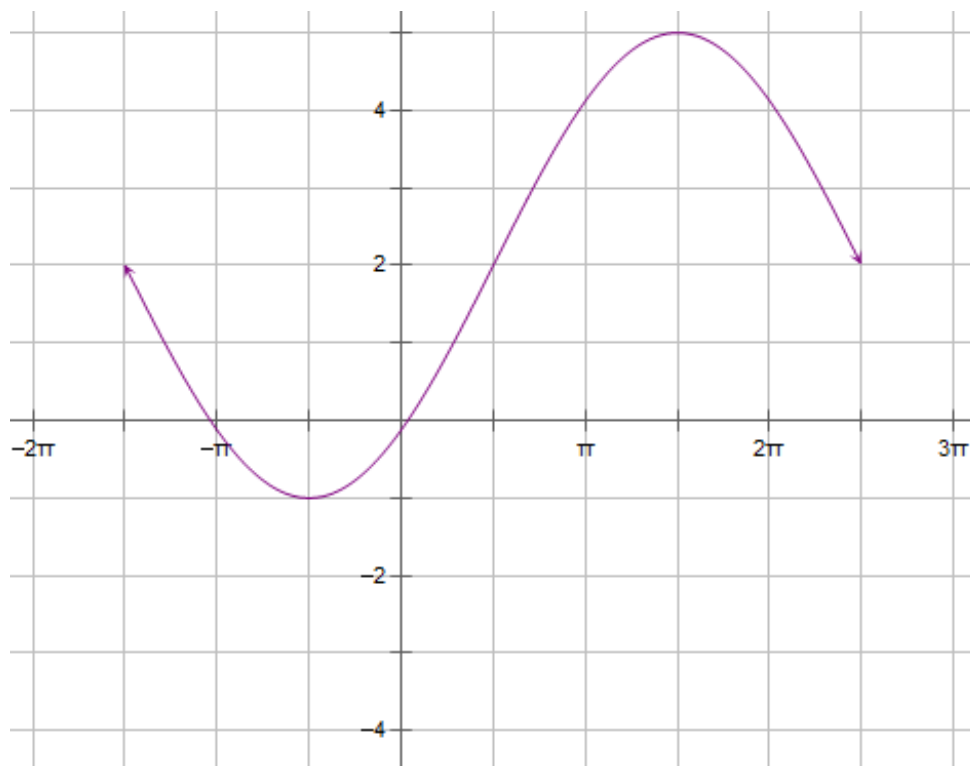


16. $y = 5\cos\left(\frac{x}{2} + \frac{\pi}{2}\right) - 1$



Graph at least one full period of the following functions.

17. $y = 2 - 3\sin\left(\frac{x}{2} + \frac{3\pi}{4}\right)$



18. $y = -1 - 2\cos(x - \pi)$

