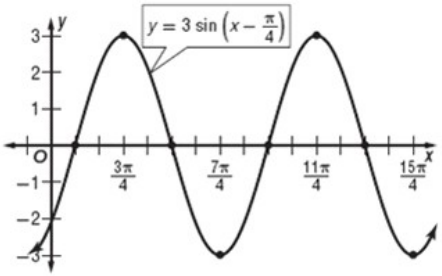
# 4-4 Graphing Sine and Cosine Functions

**State the amplitude, period, frequency, phase shift, and vertical shift of each function. Then graph two periods of the function.**

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

*ANSWER:*

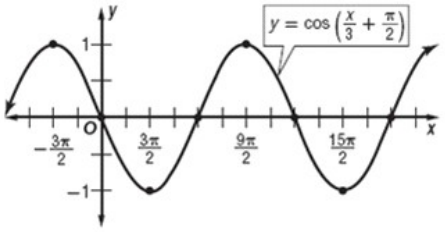
amplitude = 3; period = 2π; frequency = $\frac{1}{2\pi}$; phase shift = $\frac{\pi}{4}$; vertical shift = 0




15. $y = \cos\left(\frac{x}{3} + \frac{\pi}{2}\right)$

*ANSWER:*

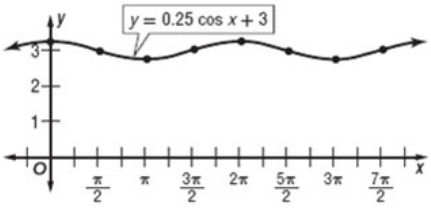
$\text{amplitude} = 1; \text{period} = 6\pi; \text{frequency} = \frac{1}{6\pi}, \text{phase shift} = -\frac{3\pi}{2}; \text{vertical shift} = 0$




16. $y = 0.25 \cos x + 3$

*ANSWER:*

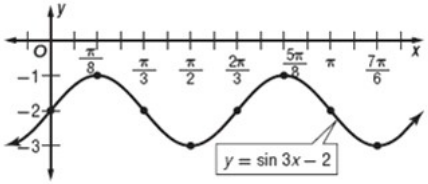
amplitude = $\frac{1}{4}$; period = 2π; frequency = $\frac{1}{2\pi}$; phase shift = 0; vertical shift = 3




17. $y = \sin 3x - 2$

*ANSWER:*

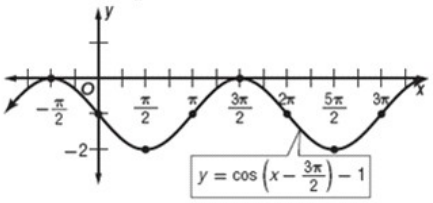
amplitude = 1; period = $\frac{2\pi}{3}$; frequency = $\frac{3}{2\pi}$; phase shift = 0; vertical shift = −2




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

*ANSWER:*

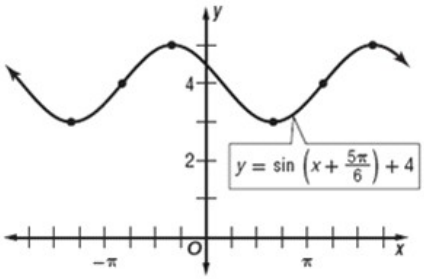
amplitude = 1; period = 2π; frequency = $\frac{1}{2\pi}$; phase shift = $\frac{3\pi}{2}$; vertical shift = −1




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

*ANSWER:*

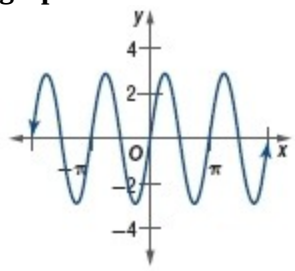
$\text{amplitude} = 1; \text{period} = 2\pi; \text{frequency} = \frac{1}{2\pi}$; phase shift



# 4-4 Graphing Sine and Cosine Functions

**Write an equation that corresponds to each graph.**

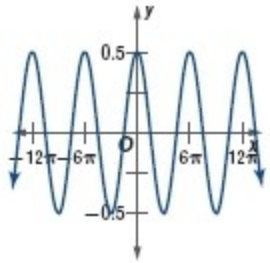
31.




*ANSWER:*

Sample answer: $y = 3 \sin 2x$

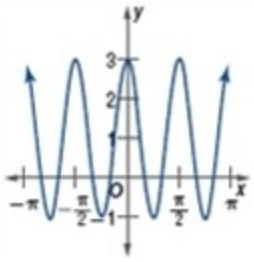
32.




*ANSWER:*

Sample answer: $y = \frac{1}{2} \cos \frac{x}{3}$

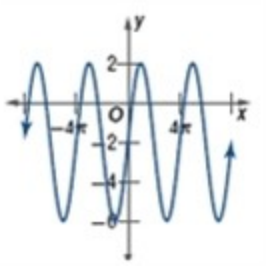
33.




*ANSWER:*

Sample answer: $y = 2 \cos 4x + 1$

34.




*ANSWER:*

Sample answer: $y = 4 \sin \frac{x}{2} - 2$