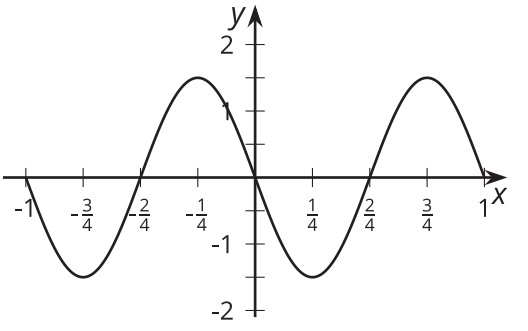
Lesson 17 Practice Problems

1. Here is the graph of a trigonometric function.

   Which equation has this graph? Select **all** that apply.



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

   B. $y = -\frac{3}{2}\sin(2\pi x)$

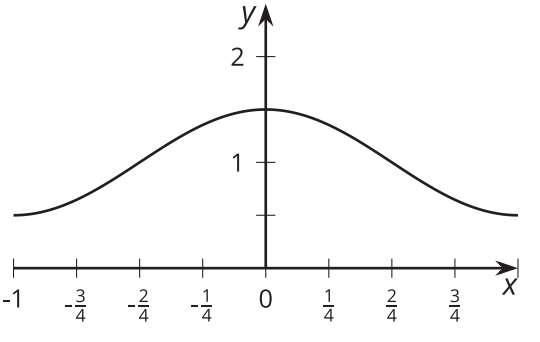
   C. $y = \frac{3}{2}\cos(2\pi x)$

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

   E. $y = \frac{3}{2}\sin(2\pi x + \pi)$

2. Here is the graph of a trigonometric function.

   Which equation has this graph?



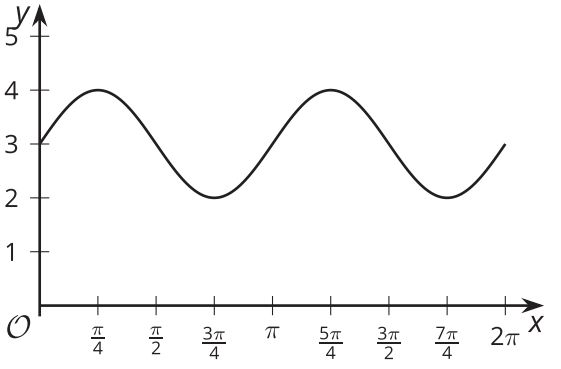
   A. $y = \cos(x) + 1$

   B. $y = \frac{1}{2}\cos(x) + 1$

   C. $y = \frac{1}{2}\cos(\pi \cdot x) + 1$

   D. $y = \frac{1}{2}\cos(2\pi \cdot x) + 1$

3. Here is the graph of a trigonometric function.



a. Find a trigonometric function f that has this graph. Explain your reasoning.

b. The graph is translated right by $\frac{\pi}{2}$ so it has a minimum value at $x = 0$, then stretched horizontally so its period is 3 times greater than the period of f. Find a trigonometric function g that has this new graph. Explain your reasoning.

4. The function f is given by $f(x) = 4 + 2\sin(\pi x)$. The graph of g is the graph of f translated left by $\frac{\pi}{2}$ and translated vertically by -1. Which expression defines g?

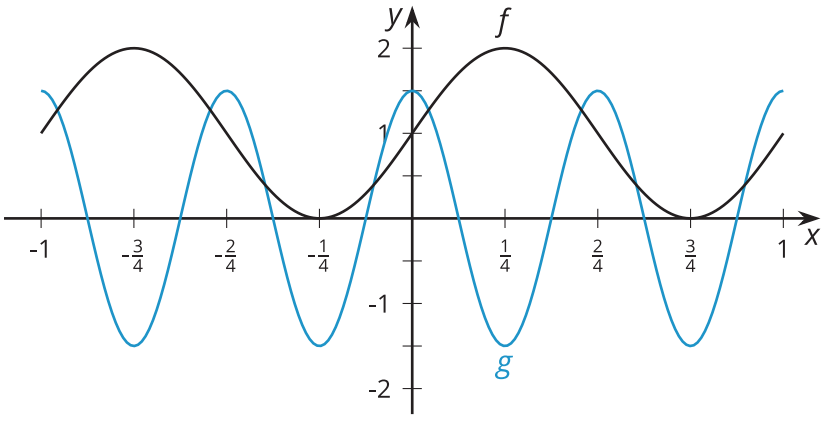
A. $5 + 2\sin\left(\pi x + \frac{\pi}{2}\right)$

B. $3 + 2\sin\left(\pi x + \frac{\pi}{2}\right)$

C. $3 + 2\sin\left(\pi\left(x - \frac{\pi}{2}\right)\right)$

D. $3 + 2\sin\left(\pi\left(x + \frac{\pi}{2}\right)\right)$

5. Here are graphs of trigonometric functions f and g. What transformations can be applied to the graph of f to get the graph of g? Make sure to list them in the order they are applied.



6. The table shows the vertical position of a point at the tip of a windmill blade after the blade has rotated through different angles. The point starts at the location furthest to the right.

rotation angle of windmill	vertical position of P in feet
$\frac{\pi}{6}$	11.25
$\frac{\pi}{3}$	$10 + \frac{2.5\sqrt{3}}{2}$
$\frac{\pi}{2}$	12.5
π	10
$\frac{3\pi}{2}$	7.5

a. How long is the windmill blade? Explain how you know.

b. What is the height of the windmill? Explain how you know.

(From Unit 6, Lesson 13.)

7. The function f is given by $f(\theta) = 6 + 5\cos\left(\theta + \frac{\pi}{2}\right)$. Which of the following are true of f? Select **all** that apply.

   A. The amplitude of f is 6.

   B. The function f takes its maximum value when $x = 0$.

   C. The midline of f is 6.

   D. The graph of f is the same as the graph of $g(\theta) = 6 + 5\cos(\theta)$ translated to the right by $\frac{\pi}{2}$.

   E. The graph of f is the same as the graph of $g(\theta) = 6 + 5\cos(\theta)$ translated to the left by $\frac{\pi}{2}$.

(From Unit 6, Lesson 14.)