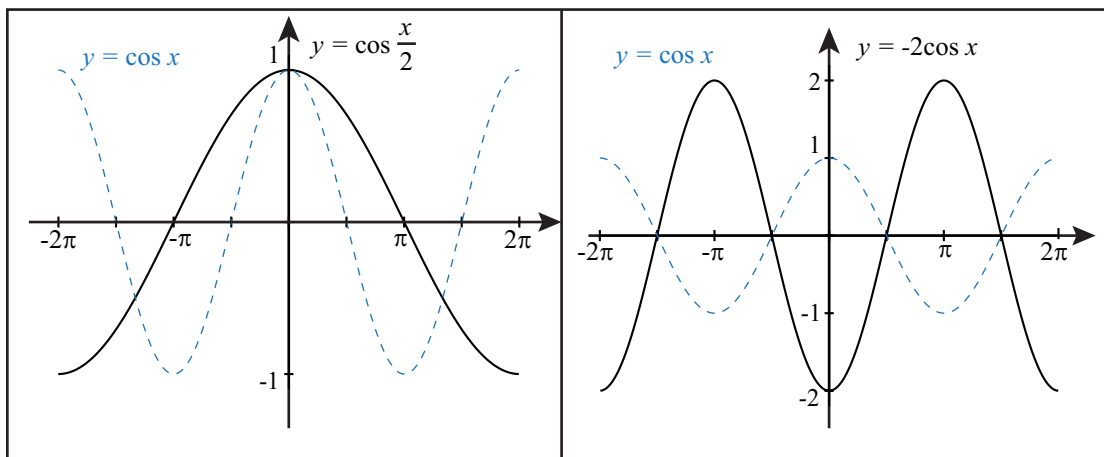# Functions Worksheet 5 - Answers

1. Graph $y = \cos\left(\frac{x}{2}\right)$ in the above grid.

2. Graph $y = -2\cos(x)$ in the above grid.

3. What is the amplitude of the function $y = \sin(x)$?
   The amplitude is 1.

4. What is the amplitude of the function $y = \cos(x)$?
   The amplitude is 2π.

5. What is the amplitude and period of the function $y = 3\sin(\pi x + 1)$?
   The amplitude is 3 and the period is 2.

6. What is the amplitude and period of the function $y = 14\cos\left(\frac{1}{\pi}\right)$?
   The amplitude is $2\pi^2$ and the period is $\frac{1}{2\pi^2}$.

7. How is the graph of $y = \cos(x)$ different from the graph of $y = \cos\left(\frac{1}{2}x\right)$?

The graph of $\cos\left(\frac{1}{2}x\right)$ is stretched out horizontally to be twice as long as $\cos(x)$.

8. How is the graph of $y = \sin(2x) + 3$ different from the graph of $y = \sin(2x)$?
   The graph of $\sin(2x) + 3$ is the same as $\sin(2x)$, only shifted up 3 units.

9. If the motion for a given spring is described by the equation $y = 10.0\cos(2.0t)$, find the spring's frequency and period.
   The period is π seconds, while the frequency is $\frac{1}{\pi}$.

10. For the spring in question 9, if the mass at the end of the spring is 50.0 kg, find the spring constant. (For an equation in the form $y = y_{max}\cos(\omega t)$, the spring constant $k = m\omega^2$.)
    $k = 100$ N/m.