## Examples 6.1 – The Cosine and Sine Functions

1. Suppose $y = -4\sin\left(3x + \frac{7\pi}{5}\right) = -4\sin\left(3\left(x + \frac{7\pi}{15}\right)\right)$. Determine the amplitude, period, and phase shift of the graph.

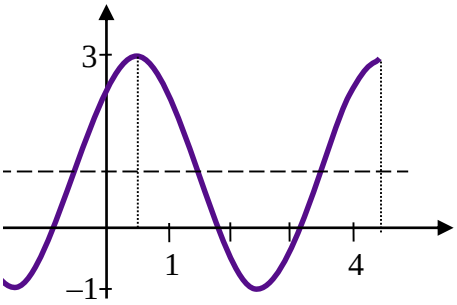
   **Solution**:

2. Let us call the horizontal line about which the graph oscillates the **midline**. With no vertical shift, the midline of a general cosine or sine function is the line $y = 0$. Determine the amplitude, period, phase shift, and midline of the sinusoidal function $y = 5\cos(3\pi x) - 2$.

   **Solution**:

3. For the graph shown on the right, find a sinusoidal formula of the form $y = A\cos(Bx - C) + D$.

   **Solution**:




4. We know that $y = \sin x$ is zero for $x = n\pi$ ($n$ an integer), and $y = \cos x$ is zero for $x = \frac{m\pi}{2}$ ($m$ an odd integer). What are the roots ($x$-intercepts) of $y = \sin\left(\frac{3\pi}{2}x - 1\right)$ and $y = \cos\left(5x + \frac{\pi}{2}\right)$?

   **Solution**: