

## 2.6 General Sinusoidal Graphs

1. This is a sine wave that has been translated 1 unit to the right and 2 units up. The amplitude is 3 and the frequency is 2. The period of the graph is  $\pi$ . The function reaches a maximum point of 5 and a minimum of -1.
2. This is a sine wave that has been translated 1 unit down and  $\frac{\pi}{3}$  radians to the left. The amplitude is 1 and the period is 2. The frequency of the graph is  $\pi$ . The function reaches a maximum point of 0 and a minimum of -2.
3. This is a cosine wave that has been translated 5 units up and 120 radians to the right. The amplitude is 1 and the frequency is 40. The period of the graph is  $\frac{\pi}{20}$ . The function reaches a maximum point of 6 and a minimum of 4.
4. This is a cosine wave that has not been translated vertically. It has been translated  $\frac{5\pi}{4}$  radians to the left. The amplitude is 1 and the frequency is  $\frac{1}{2}$ . The period of the graph is  $4\pi$ . The function reaches a maximum point of 1 and a minimum of -1. The negative in front of the cosine function does not change the amplitude, it simply reflects the graph across the  $x$ -axis.
5. This is a cosine wave that has been translate up 3 units and has an amplitude of 2. The frequency is 1 and the period is  $2\pi$ . There is no horizontal translation. Putting a negative in front of the  $x$ -value reflects the function across the  $y$ -axis. A cosine wave that has not been translated horizontally is symmetric to the  $y$ -axis so this reflection will have no visible effect on the graph. The function reaches a maximum of 5 and a minimum of 1. \*\*\*other answers are possible given different horizontal translations of sine/cosine
6.  $y = 3 + 2 \cos\left(3\left(x - \frac{\pi}{6}\right)\right)$
7.  $y = 2 + \sin x$  or  $y = 2 + \cos\left(x - \frac{\pi}{2}\right)$
8.  $y = 10 + 20 \cos(6(x - 30))$
9.  $y = 3 + \frac{3}{4} \cos\left(\frac{1}{2}(x + \pi)\right)$
10.  $y = 3 + 7 \cos\left(\frac{1}{3}\left(x - \frac{\pi}{4}\right)\right)$