

5.1 Graphs of Sine, Cosine, and Tangent Functions

BLM 5-2

1. Write an equation for each function and sketch a graph for each function on the interval $x \in [-2\pi, 2\pi]$.
 - a) cosine function with an amplitude of 3
 - b) sine function with an amplitude of $\frac{1}{2}$
reflected in the x -axis
 - c) sine function with a phase shift
of $+\frac{5\pi}{4}$
 - d) cosine function with a phase shift
of $-\frac{2\pi}{3}$
 - e) sine function with a period of π
 - f) cosine function with a period of $\frac{\pi}{2}$

2. A sine function has an amplitude of 2, is reflected in the x -axis, and has a period of $\frac{3\pi}{2}$.
 - a) Write an equation of the function in the form $y = a \sin kx$.
 - b) Graph the function over two cycles.

3. A sine function has a maximum value of 5 and a minimum value of -1 .
 - a) Determine the amplitude of the function.
 - b) Determine the vertical translation of the function.
 - c) Graph the function over two cycles.

4. One cycle of a cosine function begins at $x = -\frac{\pi}{4}$ and ends at $x = \frac{7\pi}{4}$.
 - a) Determine the period of the function.
 - b) Determine the phase shift of the function.
 - c) Write the equation of the function in the form $y = \cos[k(x - d)]$.
 - d) Graph the function over two cycles.

5. A cosine function that has a maximum of 12 and a minimum of -4 .
 - a) Determine the amplitude of the function.
 - b) Determine the vertical translation of the function.
 - c) Graph the function over two cycles.

6. **Use Technology** Using a graphing calculator to graph $y = \sin x$ and $y = \cos x$ on the same set of axes for $0 \leq x \leq 2\pi$. Round each answer to two decimal places.
 - a) For what value(s) of x is $\sin x < \cos x$.
 - b) For what value(s) of x is $\sin x > \cos x$.
 - c) For what value(s) of x is $\sin x = \cos x$.

7.
 - a) Is the function $y = -2 \cos x + 3$ even, odd, or neither? Justify your answer.
 - b) Is the function $y = \sin\left[\frac{1}{2}(x - 2)\right]$ even, odd, or neither? Justify your answer.
 - c) Is the function $y = \frac{1}{4} \sin x$ even, odd, or neither? Justify your answer.

8.
 - a) If $(k, 1)$ is a point on the graph of $y = 2 \sin\left(x - \frac{\pi}{6}\right)$, find a possible value for k .
 - b) Is there any other possible value(s) for k ? Explain.