1. Please justify all answers and show your work.

2. You may work with classmates, but all answers must be your own.

1. Make sure that when submitting your homework to Gradescope you indicate which page of your homework each question is on.

2. (a) Compute the reference angle for the angle \( \frac{7\pi}{6} \) and use it (along with your knowledge of the values of \( \sin(\theta) \) and \( \cos(\theta) \) for common angles in the first quadrant) to compute \( \sin\left(\frac{7\pi}{6}\right) \). Show your work.

(b) Compute the reference angle for the angle \( \frac{2\pi}{3} \) and use it (along with your knowledge of the values of \( \sin(\theta) \) and \( \cos(\theta) \) for common angles in the first quadrant) to compute \( \cos\left(\frac{2\pi}{3}\right) \). Show your work.
3. Fill in the points at each of the following angles on the unit circle ("unit circle" means
it has radius 1). Remember that \( x = r \cos(\theta) = \cos(\theta) \) (since \( r = 1 \) here) and \( y = r \sin(\theta) = \sin(\theta) \) (since \( r = 1 \) here), so you'll need to calculate the values of \( \sin(\theta) \) and \( \cos(\theta) \) for these angles.
4. Suppose $\theta$ is an angle such that $\sin(\theta) = -\frac{3}{5}$, and $\theta$ is in the fourth quadrant. What are $\cos(\theta)$, $\tan(\theta)$, $\csc(\theta)$, $\sec(\theta)$, and $\cot(\theta)$? Show your work.
5. Simplify the following trig expressions to an expression involving a single trig function with no fractions (for example, something of the form \( \sec(x) \) or \( \cot^2(x) \), etc.). Problems like these are not always straightforward, but you can try the methods we used in lecture - writing everything in terms of \( \sin \) and \( \cos \), multiplying by \( \frac{\sin(x)}{\sin(x)} \) (or something similar), and using the Pythagorean Identity.

(a) \( \frac{\cot(x)}{\csc(x)} \cdot \sec(x) \).

(b) \( \frac{1-\sin^2(\theta)}{\sin^4(\theta)} \).

(c) \( \frac{\sec(t)-\cos(t)}{\sin(t)} \).
6. What are the amplitude, period, midline, and horizontal shift of the sinusoidal function \( f(t) = 3 \cos \left( \frac{2\pi}{5}(x + 1) \right) - 2 \)? Write this information below the axes and use it to sketch the graph of \( f(t) \). Label the amplitude, period, and midline on the graph.
7. (a) Write an equation for the function graphed below which is in the form \( f(x) = A\sin(B(x - h)) + k \) (you need to figure out what \( A, B, h, \) and \( k \) are).

(b) Write an equation for the function graphed below which is in the form \( g(x) = A'\cos(B'(x - h')) + k' \) (you need to figure out what \( A', B', h', \) and \( k' \) are).