- 1. (10 pts) Find the values of all six trigonometric functions, given $\sec(\theta) = 4$ and $\sin(\theta) < 0$.
- 2. Consider the equation $2\sin^2(x) \sin(x) 1 = 0$.
 - a. (10 pts) Find all solutions x, in radians and degrees, to the equation in the interval $[0,2\pi]$.
 - b. (10 pts) Find all real solutions *x*, in radians *and* degrees.

It may be easier for you to use degrees to solve and then convert to radians at the end.

- 3. Consider the equation $2\sin^2(2x) \sin(2x) 1 = 0$. (Use your answer from #2, right or wrong.)
 - a. (10 pts) Find all solutions x to the equation in the interval $[0,2\pi]$. (Do degrees and radians in final answer.)
 - b. (5 pts) Find all real solutions *x*, in degrees *and* radians.
- 4. (10 pts) Re-write $\tan\left(\sec^{-1}\left(\frac{3}{x}\right)\right)$ as an algebraic expression.
- 5. (5 pts) Square both sides of sin(x) + 1 = cos(x) and solve. Find all solutions in $[0,2\pi]$. Give answer in degrees and radians.
- 6. Find the *exact* value of $\cos\left(\frac{17\pi}{12}\right)$ in two ways: (Hint: If degrees are easier for you, *use degrees*.)
 - a. (10 pts) Use a Sum identity.
 - b. (10 pts) Use a Half-Angle identity
- 7. (5 pts) Find the exact value of $\cos(\arcsin(x) + \arccos(x))$. (Hint: Use Sum identity.)
- 8. (10 pts) Find $\sin(2u), \cos(2u)$ and $\tan(2u)$, given that $\sin(u) = \frac{1}{5}$ and $\cos(u) < 0$.
- 9. (5 pts) Find the arc length on a circle of radius r = 6 that is intercepted by an angle of 900^o.

(10 pts) Bonus: Answer one of the following, for 10 points:

- 1. Build a cosine function that achieves its maximum height of y = 15 meters at time x = 3 seconds and its minimum height of y = -3 meters at x = 27 seconds.
- 2. What is the area of the sector intercepted by an arc of 50° in a circle of radius 11? Round to 4 decimal places.

