

1. (10 pts) Find the values of all six trigonometric functions, given $\sec(\theta) = 4$ and $\sin(\theta) < 0$.
2. Consider the equation $4\cos^2(x) - 3 = 0$.
 - 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 $4\cos^2(2x) - 3 = 0$. (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 $\tan\left(\sec^{-1}\left(\frac{x}{5}\right)\right)$ as an algebraic expression.
5. (5 pts) Square both sides of $\cos(x) - 1 = \sin(x)$ and solve. Find all solutions in $[0, 2\pi]$. Give answer in degrees and radians.
6. Find the *exact* value of $\sin\left(\frac{19\pi}{12}\right)$ 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 $\sin(\arcsin(x) + \arccos(x))$. (Hint: Use Sum identity.)
8. (10 pts) Find $\sin(2u)$, $\cos(2u)$ and $\tan(2u)$, given that $\sin(u) = \frac{4}{5}$ and $\cos(u) < 0$.
9. (5 pts) Find the arc length on a circle of radius $r = 9$ that is intercepted by an angle of 900° .

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

1. Build a cosine function that achieves its maximum height of $y = 19$ meters at time $x = 5$ seconds and its minimum height of $y = 1$ meter at $x = 33$ seconds.
2. What is the area of the sector intercepted by an arc of 50° in a circle of radius 15? Round to 4 decimal places.

