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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 $2 \sin ^{2}(2 x)-\sin (2 x)-1=0$. (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 $\sin (2 u), \cos (2 u)$ and $\tan (2 u)$, 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 $900^{\circ}$.
(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 $50^{\circ}$ in a circle of radius 11 ? Round to
 4 decimal places.
