Name:_____

1) Prove that $\dfrac{d}{dx}(2\csc x) = -2\csc x \cot x$

(2 Points)

2) If $f(x) = -2e^x g(x) + 5x$, where $g(0) = 4$ and $f'(0) = 6$, find $g'(0)$.

(2 Points)

3) Differentiate the following functions: (2 Points)

A) $f(x) = \dfrac{x^3 + 4x + 3}{\sqrt{x}}$

B) $y = \dfrac{-2\cos x}{1 - \sin x}$

4) Find the equation of the tangent line to the curve $y = -e^x \cos x$, at the point (0,-1). (2 Points)

5) Find the equation of the tangent line to the curve $y = -2\cos x$
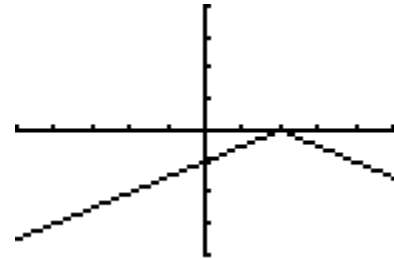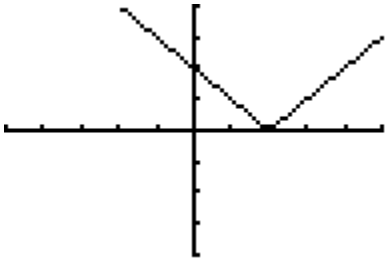   at the point $\left(\dfrac{\pi}{4}, - \sqrt{2} \right)$ (2 Points)

6) Given that $v(x) = \dfrac{f(x)}{g(x)}$, and $w(x) = f(x)g(x)$ (3 Points)

And graphs of   f(x)   and   g(x)

Find the following:

$v'(0)$

$w'(2)$

$w'(1)$

7) The position of a particle is given by the equation $S(t) = \dfrac{t^3}{3} - \dfrac{3t^2}{2} + 2t$,

    where "t" is measured in seconds and "S" is in meters.

a) When is the particle at rest?

b) When is the particle speeding up?

8) Find the equation of the tangent line to the curve $y = x \cos x$, at the point $(\pi, -\pi)$

(2 Points)

9) Find all values of x so that the graph of $f(x) = x - 2 \sin x$
   will have a horizontal tangent?

(2 Points)