Name:_____

1) Differentiate the following functions: (2 Points)

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

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

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

(2 Points)

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

(2 Points)

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

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

(2 Points)

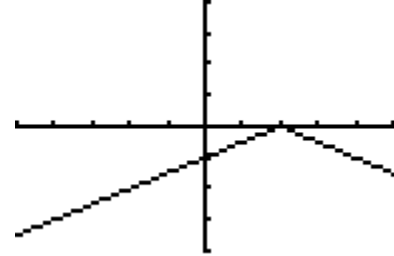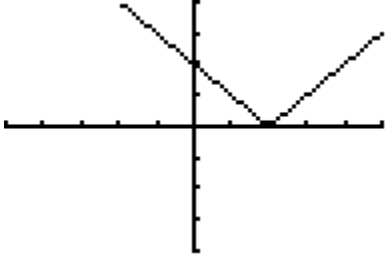7) Find the equation of the tangent line to the curve $y=x\cos x$, at the point $(\pi,-\pi)$

(2 Points)

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

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

Find the following:

$v'(0)$

$w'(2)$

$w'(1)$

8) 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?