# Math 157 - Quiz 7

October 12, 2016

Name _key_

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (7.5 points) Determine the derivative of each function.

(a) $g(t) = \sqrt{3t^2 + t + 12} = \cdot(3t^2 + t + 12)^{1/2}$

$$g'(t) = \frac{1}{2}(3t^2 + t + 12)^{-1/2} \cdot (6t+1)$$

(b) $y = x^4 e^{-x^2}$

$$\frac{dy}{dx} = 4x^3 e^{-x^2} + x^4 e^{-x^2}(-2x)$$

(c) $f(x) = \frac{\ln x}{x^3 + x^2 + x}$

$$f'(x) = \frac{(x^3 + x^2 + x)(\frac{1}{x}) - (\ln x)(3x^2 + 2x + 1)}{(x^3 + x^2 + x)^2}$$

2. (2.5 points) Find an equation of the line tangent to the graph of $y = (x^2 + 1)\ln x$ at the point where $x = 1$.

POINT: $x = 1, \quad y = 2\ln 1 = 0$

SLOPE: $\frac{dy}{dx} = 2x \ln x + (x^2+1)(\frac{1}{x})$

$x = 1 \Rightarrow m = 2\ln 1 + 2(1)$

$= 0 + 2$

$= 2$

TANGENT LINE:

$y - 0 = 2(x-1)$

OR

$y = 2x - 2$