QUIZ 3

Please show ALL of your work to receive full credit on each problem.

Problem 1. (45 points)
Find the derivative of each of the following functions:

(a) (15 pts) $f(x) = \frac{1}{\sqrt{x}} - \sqrt[4]{x}$

(b) (15 pts) $g(t) = \frac{\sin(t)}{1+\tan(t)}$

(c) (15 pts) $h(x) = (1-4x)^2 e^{2x}$

Problem 2. (20 points) Let $y = tx^2 + t^3x$. Find

(a) (10 pts) Find $\frac{dy}{dx}$.

(b) (10 pts) Find $\frac{dy}{dt}$.

Problem 3. (20 points) Use implicit differentiation to find an equation of the tangent line to the curve of

$$x^2 + 2xy + 4y^2 = 12$$

at the point $(2, 1)$.

Problem 4. (15 points) Find $y'' = d^2y/dx^2$ by implicit differentiation in the equation

$$x^3 - y^3 = 7.$$