Due date: _____ **Name:** _____

1. Find $\frac{dy}{dx}$ given that $x^3y + y^3 + \cos y = x^2$.

2. Find $\frac{dy}{dx}$ given that $xe^y = x - y$.

3. Find $\frac{dy}{dx}$ given that $x^2 = \frac{x+y}{x-y}$.

4. Find an equation of the tangent line to $x^2y^3 + 2y = 3x$ at $(1,1)$.

5. Find an equation for the tangent line of $x^2y + e^{x+y} = 1$ at $(0,0)$.

6. Find an equation for the tangent line of $\ln(y^2 + 1) = x^3 + x + 2y$ at $(0,0)$.

7. Use logarithmic differentiation to find the derivative of y with respect to x for the following functions.

a) $y = \frac{x(2x+1)^3}{\sqrt{x-2}}$

b) $y = \frac{\sqrt[4]{x}\cdot(2x^3+1)^2}{e^{\tan^{-1}x}}$

c) $y = \frac{(x-1)^4\sqrt{2x+1}}{x^6}$

d) $y = x^x$

e) $y = x^{\cos x}$

f) $y = (\cos x)^{\sqrt{x}}$

g) $y = (\sin x)^{1/x}$

Review

8. Differentiate the following functions.

a) $y = x\sqrt{\ln x}$

b) $y = \cos(\log_2(x^5 + 1))$

c) $f(x) = \sec^{-1}(3x - 2)$

d) $f(t) = \left(\tan^{-1}\sqrt{t}\right)^2$

Q: What three letter word can prefix the following three words to make three new words? Ache, Nest, and Drum.

Optional exercises from the Stewart textbook if you'd like more practice:
3.5 (p.215) #5-19 odd, 25-29 odd, 35, 37
3.6 (p.223) #39-49 odd