Math 106, Sect. 550 **Quiz 5** **28 Sept 06**

Name: _____

Recitation Section: _____

Show your work.

1. (7 pts) Using implicit differentiation, find $\frac{dy}{dx}$ for $\left(x^2+y^2\right)^2 = x - y$.

   What is $\frac{dy}{dx}$ at $(1,-1)$?

$$2(x^2+y^2)\left(2x + 2y\frac{dy}{dx}\right) = 1 - \frac{dy}{dx}$$

$$4x(x^2+y^2) + 4y(x^2+y^2)\frac{dy}{dx} + \frac{dy}{dx} = 1$$

$$\frac{dy}{dx}(1 + 4y(x^2+y^2)) = 1 - 4x(x^2+y^2)$$

$$\frac{dy}{dx} = \frac{1 - 4x(x^2+y^2)}{1 + 4y(x^2+y^2)}.$$

$$At\,(1,-1), \frac{dy}{dx} = \frac{1-8}{1-8} = 1.$$

2. (3 points) Find $\frac{dy}{dx}$ for

$$x = 2t - 5, \quad y = 4t - 7, \quad -\infty < t < \infty.$$

$$\frac{dx}{dt} = 2,\ \frac{dy}{dt} = 4$$

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}} = 4/2 = 2$$