Math 1823-004 Quiz 9 Spring 2016

Name: Solution

Student Number:

Problem 1
Find dy/dx by implicit differentiation.

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

Differentiate both sides with respect to x:

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

$$2x - \frac{d}{dx}(4xy) + \frac{d}{dx}(y^2) = 0$$

$$2x - \underbrace{4y - 4x\frac{dy}{dx}}_{\text{product rule}} + \underbrace{2y\frac{dy}{dx}}_{\text{chain rule}} = 0$$

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

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

So, $$\frac{dy}{dx} = \frac{2y - x}{y - 2x}$$