Quiz 9 Solutions: Math 141 Spring 2008

(1) Consider the curve described by the equation

$$y(x - x^2) + y^3 = 8$$

(a) Confirm that the point $(1, 2)$ is on curve?(1 point)

$$2(1 - 1^2) + 2^3 = 8$$

(b) Use implicit differentiation to determine $\frac{dy}{dx}$.(4 points)

$$y(1 - 2x) + \frac{dy}{dx}(x - x^2) + 3y^2\frac{dy}{dx} = 0 \rightarrow \frac{dy}{dx} = \frac{-y(1-2x)}{x-x^2+3y^2}.$$

(c) What is the value of $\frac{dy}{dx}\big|_{x=1,y=2}$?(2 points)

$$\frac{dy}{dx}\big|_{x=1,y=2} = \frac{-2(1-2(1))}{1-1^2+3(2)^2} = \frac{1}{6}$$

(d) What is the equation of the tangent line passing through the point $(1, 2)$?(3 points)

$$y - 2 = \frac{1}{6}(x - 1)$$