MATH 135: Quiz 7

October 21, 2014

Name: _____ Sec: _____

1. Use implicit differentiation to find $\dfrac{dy}{dx}$ for the equation below. Your answer can be left as a function of both x and y.

$$y^3 + x^2 y^2 = 2x^2 + 2y + 4$$

2. Find $\dfrac{dy}{dx}$ for the function below. Leave your answer **only** as a function of x. (Hint: Logarithmic differentiation)

$$y = x^{\sin x}$$

3. A 13 ft long ladder is leaned up against a wall as shown in the picture on the right. As the bottom of the ladder slides away from the wall, the top slides down the wall. Let x represent the distance the base of the ladder is from the wall, and y, the height of the top of the ladder off the ground.

(a) What is an equation relating the distances x and y in the figure? (Hint: The ground, wall, and ladder make up a right triangle)

(b) How high is the top of the ladder off the ground when the base is 5 feet from the wall?

(c) Differentiate your equation in (a) to get a relation between the changes of x and y with respect to time t.

(d) If the base of the ladder is sliding away from the wall at a rate of $\dfrac{dx}{dt} = 2$ ft/s when the base is 5 feet from the wall, how fast is the top sliding down at this moment?