

Homework 3 (MATH 2310-04)**Name (Print):****Due date: Thursday, Feb. 20, 2014**

1. Determine whether the following differential equation is exact. If it is exact, find the solution.

$$\frac{y}{x} + 6x + (\ln(x) - 2) \frac{dy}{dx} = 0. \quad x > 0$$

Solution : This equation is exact : $y = \frac{C - 3x^2}{\ln(x) - 2}$

2. Determine whether the following differential equation is exact. If it is exact, find the solution.

$$ye^{xy} \cos(2x) - 2e^{xy} \sin(2x) + 2x + (xe^{xy} \cos(2x) - 3) \frac{dy}{dx} = 0.$$

Solution : This equation is exact : $e^{xy} \cos(2x) + x^2 - 3y = C.$

3. Determine whether the following differential equation is exact. If it is exact, find the solution for the following initial value problem.

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

Solution : This equation is exact : $y = \frac{1}{2} \left(x + \sqrt{28 - 3x^2} \right)$