Homework Assignment 5 in Differential Equations, MATH308-SUMMER 2012

due to June 11, 2012

This assignments consist of 3 problems. Each problem costs 40 points, so you can get 120 points (out 100) here.

Topics covered : *exact equations (corresponds to sections 2.6 in the textbook).*

1. Determine whether the differential equation

$$2x(1+\sqrt{x^2-y})dx - \sqrt{x^2-y}dy = 0$$

is exact. If it is exact, find the general solution (here we work in the domain $\{(x,y) : y < x^2\}$).

2. Find the values of parameters a and b for which the differential equation

$$(ax^2y^2 + xy^3) + (x^3y + bx^2y^2)y' = 0$$

is exact, and then the solution satisfying the initial condition $y(1) = 2$ in the case of those values of a and b.

3. Find the integrating factor and solve the differential equation

$$dx + \left(\frac{2x}{y} + cos(y^3)\right) dy = 0.$$