

Homework Assignment #4

Fall 2013 - MATH308

due Friday September 13 at the beginning of class

Topics covered : *Differences between linear and non-linear equations (section 2.4). Exact equations and integrating factors (section 2.6)*

1. Determine (without solving the problem) an interval in which the solution of the given IVP is certain to exist:

$$(16 - t^4)y' - (\ln(1 - t))y = 13t^2, \quad y(-1) = -2013$$

2. Show that the following ODE is exact and then solve it:

$$y \cos(xy) - e^{2y} + (x \cos(xy) - 2y - 2xe^{2y})y' = 0$$

3. Solve the differential equation

$$6xy \, dx + (4y + 9x^2) \, dy = 0$$

by finding an appropriate integrating factor to make it exact.