

# MATH 411, Spring 2001

## Homework 1

Due: 30 January, 2001

R. Redheffer, *Differential Equations*:

[2.1]: 3, 5, 12, 13(a);

[2.2]: 3(c,e,f), 5, 6, 9;

[2.3]: 2, 4, 6 (for 6 see the definition of first integral on page 38);

[2.4]: 4, 5, 6 (for 6 read about Bernoulli equation on page 43).

Check that following equations are in exact differential form and solve them.

$$\left(2x + \frac{x^2 + y^2}{x^2 y}\right) dx = \frac{x^2 + y^2}{xy^2} dy, \quad (a)$$

$$\left(\frac{\sin 2x}{y} + x\right) dx + \left(y - \frac{\sin^2 x}{y^2}\right) dy = 0, \quad (b)$$

$$\left(\sin y + y \sin x + \frac{1}{x}\right) dx + \left(x \cos y - \cos x + \frac{1}{y}\right) dy = 0, \quad (c)$$

$$\frac{2x dx}{y^3} + \frac{(y^2 - 3x^2) dy}{y^4} = 0, \quad y \Big|_{x=1} = 1. \quad (d)$$

All problems are estimated by 5 points, except 12 in [2.1], 3 in [2.2], 6 in [2.3], 6 in [2.4], d, which are estimated by 7 points.