

Math 2233  
Homework Set 4

1. Find an integrating factor for each of the following differential equations and obtain the general solution.

(a)  $y + (y - x)y' = 0$

(b)  $x^2 + y^2 + x + yy' = 0$

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

(d)  $xy - x^2y' = 0$

2. Solve the following first order differential equations using the substitution  $u = y/x$ .

(a)  $xy' - y = \sqrt{xy}$

(b)  $y' = \frac{y^2 + xy}{x^2}, y(1) = 1$

(c)  $3xyy' + x^2 + y^2 = 0$

3. Find a substitution that provides a solution to the following differential equations.

(a)  $xy' + y = (xy)^3$

(b)  $(x + y)y' = (2x + 2y) - 3$