

E117 Exam 1 September 30, 2013

Solve any 5 of the 6 differential equations. notation:  $y(x)$ ,  $y$  is a function of  $x$ , and  $y' = \frac{dy}{dx}$ , and  $y'' = \frac{d^2y}{dx^2}$ ,  $\csc(x) = 1/\sin(x)$ . It is not necessary to simplify the final expressions.

1.  $xy' + y = y^2$

2.  $y' + \frac{1}{x}y = 3x^2$

3.  $y' = \frac{6xy - 4/x}{3y^2 - 3x^2}$

4.  $y'' + 9y = \csc(3x)$

5.  $x^2y'' - 5xy' + 9y = 0$

6.  $y' = \frac{y-3}{x+y+1}$