

Math 3331- HW2

1. Solve the following ODEs (Bernoulli)

$$(i) \frac{dy}{dx} - xy = x^3 y^3 \quad (T5)$$

$$(ii) y' - 2y = 2y^{1/2}, \quad y(0) = 1 \quad (T10)$$

$$(iii) \frac{dy}{dx} - 4y = \frac{48x}{y^2}, \quad y(0) = 1 \quad (T11)$$

2. Solve the following ODEs (Riccati)

$$(i) y' = 1 + x - (2x + 1)y + xy^2, \quad y_1 = 1 \quad (T56)$$

$$(ii) y' = e^{2x} + (1 - 2e^x)y + y^2, \quad y_1 = e^x \quad (T57)$$

$$(iii) xy' = x^3 + (1 - 2x^2)y + xy^2, \quad y_1 = x \quad (T59)$$

3. Solve the following ODEs (homogeneous)

$$(i) \frac{dy}{dx} = \frac{x + y}{x - y} \quad (T28)$$

$$(ii) \frac{dy}{dx} = \frac{x + 2y}{2x + y} \quad (T31)$$

$$(iii) \frac{dy}{dx} = \frac{x^3 + x^2y + 2xy^2 + y^3}{x(x + y)^2} \quad (T30)$$

Due: Monday Feb. 5, 2024