NDU

MAT 235

Ordinary Differential Equations

Exam # 1

Duration: 55 minutes

Name: _____

Section: _____

Instructor: _____

Grade: _____

1) **(18 points)** Solve the differential equation $3\frac{dy}{dx} + y = (1-2x)y^4$.

2) (18 points) Solve the differential equation $\frac{dy}{dx} = \frac{-2x}{x^2 + e^y}$.

3) **(23 points)** Solve the initial value problem

$$xy\frac{dy}{dx} = 2y^2 + 4x^2 \qquad \text{with} \qquad y(2) = 4, \qquad x > 0 \quad \text{and} \quad y > 0$$

4) **(23 points)** Solve the differential equation

$x\dfrac{dy}{dx} = 1 - x^2y^2 - y$, with $y(0) = 1$ (***Hint:*** You can use the substitution $v = xy$)

5) (18 points) Find the family of orthogonal trajectories to the given family of curves $c^2x^2 + y^2 = c^2$.