

Quiz 1 **MAP 2302/3305 – Ordinary Differential Equations**

Student's Name: _____

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This is a 50 minute quiz.

1. Solve the differential equation

$$ty' + y = 2t + 1$$

given the initial condition $y(1) = 5$. Find the largest interval on which the solution $y(t)$ exists.

2. Find the general solution to the differential equation

$$\frac{dy}{dx} = x\sqrt{y+1}.$$

Find the solution curve that passes through the point $(x_0, y_0) = (2, 3)$.

3. A certain college graduate borrows \$8000 to buy a car. The lender charges interest at an annual rate of 10%. Assume that the interest is compounded continuously and that the borrower makes payments continuously at a constant annual rate k .

(a) Set up the differential equation.

(b) Find the general form of the solution.

(c) How large does k have to be so that the loan is eventually paid off?