

Math 240 - Quiz 2

September 2, 2021

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due September 7.

1. (4 points) Consider the differential equation $\frac{dy}{dx} = 3y^{2/3}$.

(a) Referring to our existence/uniqueness theorem, explain why we should not expect this ODE to have a unique solution passing through any point where $y = 0$.

(b) Use a slope field generator (see the links on our Lecture Resources page) to construct the slope field for the ODE.

(c) Find the solution(s) passing through $(0, 0)$. Preferably, use your slope field to guess and check the solution(s) rather than use a solution technique.

Turn over.

2. (3 points) Solve the initial value problem: $x \frac{dy}{dx} + y = y^2$, $y(1) = \frac{1}{2}$.

3. (3 points) Solve the initial value problem: $\frac{dy}{dx} = \frac{1}{x + y^2}$, $y(-2) = 0$.

(Hint: Write the differential equation for dx/dy and solve by letting y be the independent variable.)