

Math 240 - Quiz 2

August 31, 2023

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due September 5.

1. (5 points) Consider the equation $\frac{dy}{dx} = 2xy^2 + 3x^2y^2$.

(a) Use our existence/uniqueness theorem to say what you can about possible solutions through a given point.

(b) Use a slope field generator to construct a slope field for the equation in the vicinity of the point $(1, -1)$. Print and attach your slope field (or email it).

(c) Solve the equation along with the initial condition $y(1) = -1$.

Turn over.

2. (1 point) Use Euler's method (preferably on a calculator or computer) with $h = 0.1$ to estimate $y(2)$ for the IVP

$$\frac{dy}{dx} = 2xy^2 + 3x^2y^2, \quad y(1) = -1.$$

3. (2 points) Use Euler's method (by hand) with $h = 0.1$ to estimate $y(0.3)$ for the IVP

$$y' = -2xy, \quad y(0) = 2.$$

4. (2 points) Find the exact solution of the IVP in problem 3.