MAT 132
Summer II 2019
Quiz 3
07/31/19
Time Limit: 50 minutes

Name (Print): _____

ID number _____

Instructions

- This exam contains 8 pages (including this cover page) and 5 problems. Check to see if any pages are missing. Enter all requested information on the top of this page, and put your initials on the top of every page, in case the pages become separated.

- You may *not* use your books, notes, or any device that is capable of accessing the internet on this exam (e.g., smartphones, smartwatches, tablets). You may not use a calculator.

- **Organize your work**, in a reasonably neat and coherent way, in the space provided. Work scattered all over the page without a clear ordering will receive very little credit.

- **Mysterious or unsupported answers will not receive full credit**.

Problem	Points	Score
1	2	
2	4	
3	4	
4	4	
5	6	
Total:	20	

1. Match the differential equations and slope fields below. Explain your reasoning in the space provided below each equation.
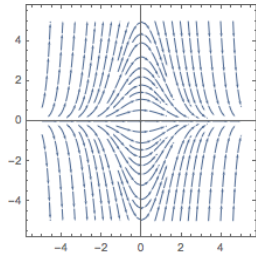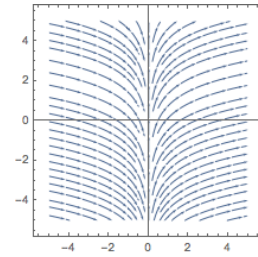

Figure 1: Slope field 1

Figure 2: Slope field 2

(a) (1 point)

$$y' = -xy$$

(b) (1 point)

$$y' = \frac{1}{x}$$

2. (4 points) Consider the initial-value problem

$$y'(x) = x + y,$$
$$y(0) = 1.$$

Estimate the value of $y(1)$ using Euler's method with 4 steps.

3. A population $P(t)$ satisfies the initial-value problem

$$\frac{dP}{dt} = 0.4P - 0.001P^2, \quad P(0) = 50.$$

(a) (3 points) Find $P(t)$.

(b) (1 point) What is the limiting value for the population when $t \to \infty$?

4. (4 points) Solve the following first-order equation

$$y'(x) + xy(x) = x.$$

5. Solve the following second-order equations

    (a) (2 points) $y'' - 5y' + 6y = 0$.

    (b) (2 points) $y'' + 4y' + 4y = 0$.

(c) (2 points) $y'' + 4y = 0$.