Practice Quiz 6 MATH 2280, ORDINARY DIFFERENTIAL EQUATIONS, FALL 2023

NAME: A#:

Problem 1. Chapter 9 Ex.2a For the given differential equation construct the slope field on the 2×2 grid.

$$\frac{dy}{dx} = \frac{1}{2}(x^2 + y^2)$$

at

$$(x, y) = (0,0), (1,0), (0,1), (1,1)$$

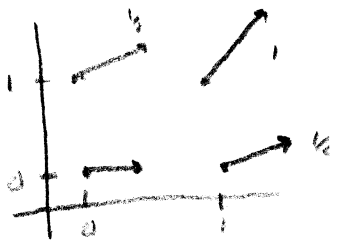
Solution:

$(0,0) \Rightarrow \frac{dy}{dx} = \frac{1}{2}(0^2+0^2) = 0$

$(1,0) \Rightarrow \frac{dy}{dx} = \frac{1}{2}(1^2+0^2) = \frac{1}{2}$

$(0,1) \Rightarrow \frac{dy}{dx} = \frac{1}{2}(0^2+1^2) = \frac{1}{2}$

$(1,1) \Rightarrow \frac{dy}{dx} = \frac{1}{2}(1^2+1^2) = 1$



Problem 2. Chapter 9.4 (10 points) On page 173 of the textbook is a slope field for some first order differential equation.

a Sketch the graphs of solutions to this differential equation that satisfy

i. $y(0) = 2$

ii. $y(0) = 4$

iii. $y(0) = 4.5$

b. What approximately, is $y(4)$ is y is the solution of the different equation satisfying

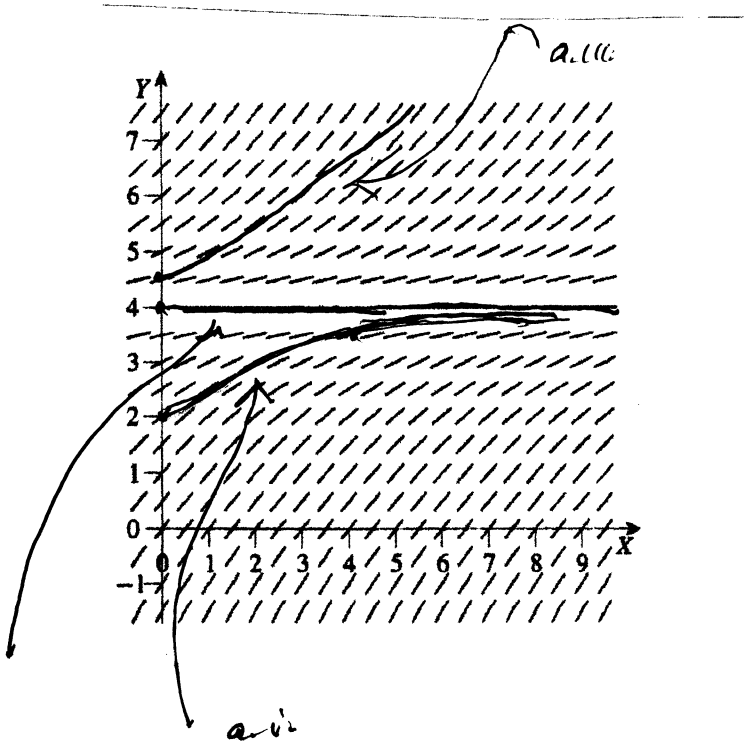
i. $y(0) = 2$?

ii. $y(0) = 4$?

iii. $y(0) = 4.5$?

Solution:

a. ↴



b.i) 3.5

b.ii) 4.0

b.iii) 7.0