

Mathematics 172

Quiz 18

Name: _____

You must show your work to get full credit.

Consider a system of differential equations

$$\begin{aligned}\frac{dx}{dt} &= .5x(10 - x - 2y) \\ \frac{dy}{dt} &= .2y(30 - 6x - 5y)\end{aligned}$$

1. If $x(4) = 1$ and $y(4) = 6$ what are $x'(4)$ and $y'(4)$? $x'(4) =$ _____

$y'(4) =$ _____

2. For the same equations assume we have solutions with $x(0) = 6$ and $y(0) = 1$

(a) What are $x'(0)$ and $y'(0)$? $x'(0) =$ _____

$y'(0) =$ _____

(b) Is $x(t)$ initially increasing or decreasing? Write a sentence or two explaining your answer.

(c) Is $y(t)$ initially increasing or decreasing? Write a sentence or two explaining your answer.