

Quiz 2

Name: _____

You will have 20 minutes ◦ Calculators are allowed ◦ Show all work for credit ◦ Don't cheat ◦ attempts at a problem may count for partial credit.

1. The volume of a cell increases at a rate of $10 \mu\text{m}^3$ per hour.

(a) [2 pts] Express this statement as a differential equation.

(b) [2 pts] Find the solution to this equation assuming the volume of the cell was initially $500\mu\text{m}^3$.

2. [4 pts] Find the solution to the following differential equation:

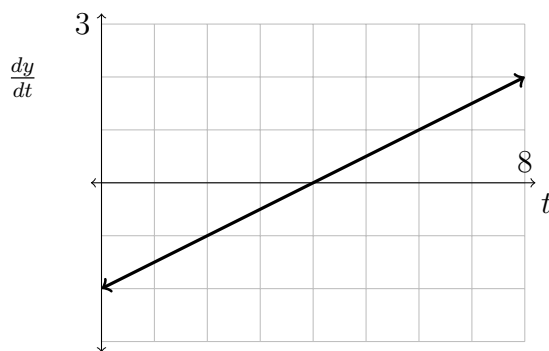
$$\frac{dy}{dt} = 2 + e^{-t}, \quad y(0) = 1.$$

3. [3 pts] Suppose that $f(x) = 2x^2 + 7$.

(a) What differential equation does $f(x)$ solve?

(b) What is the initial condition?

4. Below is the graph of $\frac{dy}{dt}$ as a function of time.



(a) [1 pts] On which interval(s) is $y(t)$ increasing?

(b) [1 pts] On which interval(s) is $y(t)$ decreasing?

(c) [2 pts] Sketch a graph of $y(t)$ assuming an initial condition of $y(0) = 0$.

