Mathematics 172

Quiz #31 Name: Key

You must show your work to get full credit.

1. A gallon of grape juice is contaminated by .003 grams of yeast. The yeast grows with a discrete exponential of $r = 2.1(grams/[redacted]r)gram$.

(a) How many grams of yeast are there after t hours?

$A(t) = A(0)\lambda^t$
$= A(0)(1+r)^t$
$= .003(3.1)^t$

Grams after t hours. $.003(3.1)^t$

(b) How long until there are 10 grams of yeast?

Solve

$.003(3.1)^t = 10$
$(3.1)^t = 10/.003$
$t \ln(3.1) = \ln(10/.003)$

$t = \frac{\ln(10/.003)}{\ln(3.1)}$
$= 7.1696$

Time to get 10 grams. 7.17 hours

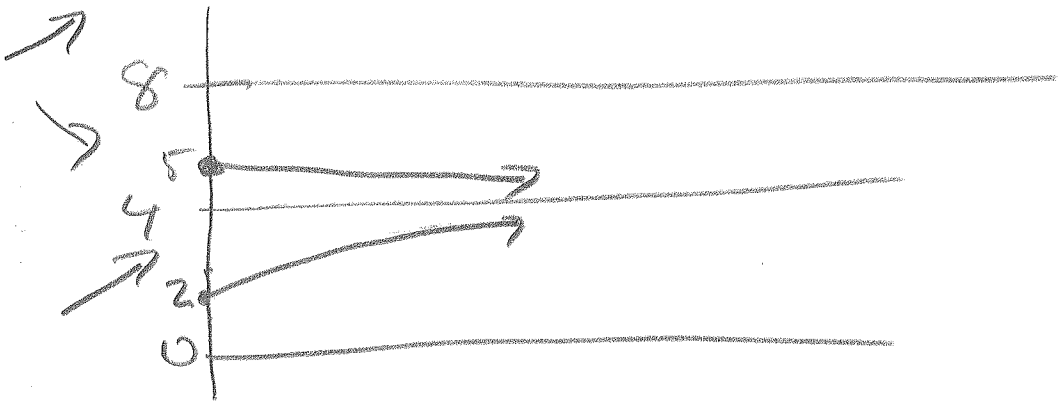
2. For the rate equation $\frac{dy}{dt} = .1y(y-4)(y-8)$

(a) What are the equilibrium points?

$y = 0, 4, 8$

0, 4, 8

(b) Draw the solutions with $y(0) = 2$ and $y(0) = 5$.



(c) For the solution with $y(0) = 5$ estimate $y(100)$.

$y(100) \approx$ 4