Mathematics 172

Quiz 13 Name: Key

You must show your work to get full credit.

1. Compute the following derivatives:

(a) $y = 4e^{3x}$ $y' =$ $12e^{3x}$

$y' = 3 \cdot 4e^{3x} = 12e^{3x}$

(b) $N(t) = 42e^{-.2t}$ $N'(t) =$ $-8.4e^{-.2t}$

$N'(t) = (-.2)42e^{-.2t} = -8.4e^{-.2t}$

(c) $f(t) = A_0e^{rt}$ where A_0 and r are constants. $f'(t) =$ rA_0e^{rt}

$f'(t) = A_0e^{rt}(r) = rA_0e^{rt}$

2. (a) solve the following:

$$P'(t) = .2P(t), \quad \text{and} \quad P(0) = 50.$$

$P(t) =$ $50e^{.2t}$

We know that

$P' = rP$, $P(0) = P_0$

implies $P(t) = P_0e^{rt}$

In our case $r = .2$, $P_0 = 50$

(b) What is $P(30)$? $P(30) =$ $20,171.4$

$P(30) = 50e^{.2(30)} =$