

Name:

Section 3.3 In class examples

Math 151 – Spring 2018

Section 3.3

1. Find the derivative of each of the following functions

(a) $f(t) = (t^2 + 1)^{100}$

Chain rule: $f'(t) = 100(t^2 + 1)^{99} \cdot (2t)$

(b) $f(t) = 6e^{5t} + e^{-t^2}$

$f'(t) = 6 \cdot 5e^{5t} + (-2t) \cdot e^{-t^2}$

2. Find the relative rate of change $\frac{f'(t)}{f(t)}$ for $f(t) = \ln(t^2 + 1)$ at $t = 2$.

$$\frac{f'(t)}{f(t)} = \frac{2t}{t^2 + 1} \cdot \frac{1}{\ln(t^2 + 1)}, \text{ therefore } \frac{f'(2)}{f(2)} = \frac{4}{5 \ln(5)}$$

3. If you invest P dollars in a bank account at an annual interest rate of $r\%$, then after t years you will have B dollars, where

$$B = P \left(1 + \frac{r}{100} \right)^t$$

(a) Find $\frac{dB}{dt}$, assuming P and r are constant. In terms of money, what does $\frac{dB}{dt}$ represent?

See homework5 solutions Section 3.3 Problem 35a

(b) Find $\frac{dB}{dr}$, assuming P and t are constant. In terms of money, what does $\frac{dB}{dr}$ represent?

See homework5 solutions Section 3.3 Problem 35b