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