Chapter 3

logarithms review

$$x^2 = 4$$
$$x = \sqrt{4}$$
$$x = 2$$

x^2
$x \to 4$ ← inverse of a square
$\sqrt{x}$
$4 \to 2$

$$3^2 = 9 \qquad 3^x = 9$$
$$\log_3 9 = 2 \qquad x = 2$$
$$3^x \to$$
$$2 \to 9 \qquad e^x = 10$$
$$\log_e 10 = e$$

natural logs are $\log_e$.
for short, use ln.
log by base means $\log_{10}$
logs and derivatives

$$(\ln x) = \frac{1}{x}$$
$$(e^x) = e^x$$
$$(3^x)' = x \cdot 3^{x-1} \; X \quad \text{cant do this.}$$
x is not a number so you cant do this
$$\underline{(3^x)' = \ln 3 \cdot 3^x}$$

Use your calculator

Homework 3.1 review

Solve for t
$$e^{-0.32t} = 0.89$$

$$\ln e^{-0.32t} = \ln 0.87$$
$$-0.32t = \ln 0.87$$
$$t = \frac{\ln(0.87)}{-0.32}$$

$$t = \frac{-0.1165}{-0.32}$$

$$t = 0.3642$$

If the base is negative,
it doesn't exist

Solve for P to two decimal places
$$72500 = Pe^{0.078(10)}$$
$$e^{0.078(10)} = 2.1815 \qquad 33234.44$$
$$72500 = P(2.1815)$$
$$\frac{72500}{2.1815} = P$$
$$33,234.44 = P$$

Solve

$$e^{0.006x} = 26$$

$$\ln e^{0.006x} = \ln 26$$

$$0.006\,x = \ln 26$$

$$x = \frac{\ln 26}{0.006}$$

Use a calculator and evaluate A to the nearest cent

$$A = \$7000 e^{0.03t} \quad \text{for } t = 4, 8, 9$$

$t = 4, A \approx \$7892.48$ **Use graphing function**

$t = 8, A \approx \$8898.74$

$t = 9, A \approx \$9169.75$

If \$3000 is invested at 8.6% compounded continuously, graph the amount in the account as a function of time for a period of 9 years.

$$A = Pe^{rt}$$

$P = 3000$ $\quad f(t) = 3000 e^{0.086t}$

$r = 0.086$ $\quad f(9) = 3000 e^{0.086(9)}$

$t = 9$

$$f(x) = \frac{|x-1|}{x-1}$$

$$|a| \begin{cases} a, & a > 0 \\ -a, & a < 0 \end{cases}$$

$$\frac{|x-1|}{x-1} \begin{cases} \dfrac{x-1}{x-1} \nearrow 1 & \quad 1 \quad x \geq 1 \qquad \lim\limits_{x \to 1^{+}} f(x) = 1 \\[4mm] \dfrac{-(x-1)}{x-1} \searrow -1 & \quad -1 \quad x < 1 \end{cases}$$

Find $\dfrac{d}{dx}\left(\dfrac{1.6}{\sqrt[4]{x^3}} - 3.9x^{-4} + 2x\right).$

$= 1.6x^{-\frac{3}{4}} - 3.9x^{-4} + 2x$