You have $1500 in an account that pays 4.5% annual interest compounded continuously. How much will you have in the account after 15 years?

\[
A(t) = P \cdot e^{rt}
\]

\[
A(15) = 1500 \cdot e^{0.045 \cdot 15} 
\]

\[
= 2902.92
\]

You have $1500 in an account that pays 4.5% annual interest compounded continuously. How much will you have in the account after 15 years?

\[
A(t) = P \cdot e^{rt}
\]

\[
A(15) = 1500 \cdot e^{0.045 \cdot 15} 
\]

\[
= 2902.92
\]

\[
\%
\]

**Bell Work**

You have $1500 in an account that pays 4.5% annual interest. How much will you have in the account after 15 years? A(t) = P \cdot e^{rt}

\[
A(t) = 1500 \cdot e^{0.045 \cdot 15} 
\]

\[
= 2902.92
\]

Many measurements of the physical world have such a wide range of values the reported values are logarithms (exponents) of the values, not the actual values. When you are using the logarithm of a quantity instead of the quantity, you are using a Logarithmic Scale. Richter Scale

A logarithm is an exponent!!!

**7.3 Logarithmic Functions as Inverses**

**Objective:**
To write and evaluate logarithmic functions

The exponential function \(y = b^x\) is one to one, so its inverse \(x = b^y\) is a function.

\[
x = b^y \quad \rightarrow \quad y = \log_b x \quad \text{b > 0, b \neq 1}
\]

Switch x and y, solve for y

To solve for y

Take the log of the function!!

\[
\log_b x = y \quad \text{base}\n\]

\[
x = b^y \quad \text{base}\n\]

\[
x = b^y \quad \text{exponent}\n\]

\[
x = b^y \quad \text{answer}\n\]

In other words, y is the exponent to which b must be raised to get x

\[
\log_b x = y
\]

**Writing Exponential Equations in Logarithmic Form**

\[
x = b^y \quad \rightarrow \quad \log_b x = y
\]

What is the logarithmic form of each equation?

1) \(100 = 10^2\)

\[
\log_{10} 100 = 2
\]

2) \(81 = 3^4\)

\[
\log_3 81 = 4
\]
What is the logarithmic form of each equation?

3) \[36 = 6^2\]
\[\log_6 36 = 2\]

4) \[1 = 3^0\]
\[\log_3 1 = 0\]

5) \[\frac{8}{27} = \left(\frac{2}{3}\right)^3\]
\[\log\left(\frac{2}{3}\right)^3 = 3\]

A common logarithm is a logarithm with base 10.

If the base is 10 you can write the logarithm without using the 10.

\[\log_{10} x = \log x\]

On your graphing calculator

Graph \[y = 10^x\]

and its inverse \[y = \log_{10} x\]

What is the asymptote for both graphs?

Graph by hand. Draw the line of reflection.

Graph \[y = 3^x\]
\[\text{and its inverse } y = \log_3 x\]

What is the asymptote for both graphs?

Class Work:

page 456 13-31 odds

Homework:

page 456 16, 18, 26, 28, 30, 46
    page 447 6, 20