

PreCalculus: Section 4.2 Applications of Logarithmic Functions

That crazy number e !

$$e = 1 + 1/1! + 1/2! + 1/3! + 1/4! + 1/5! + 1/6! + 1/7! + \dots$$

The Natural Logarithmic Function:

- For $x > 0$, $y = \log_e x$ if and only if $x = e^y$
- $f(x) = \log_e x = \ln x$

Properties of Natural Logarithms:

1. $\ln 1 = 0$ because $e^0 = 1$
2. $\ln e = 1$ because $e^1 = e$
3. $\ln e^x = x$ and $e^{\ln x} = x$ Inverse Properties
4. If $\ln x = \ln y$, then $x = y$ One-to-One Property

Examples:

- a. $\ln(1/e)$ b. $e^{\ln 5}$ c. $2\ln(e)$

Exponential and Logarithmic Functions are inverse functions. Therefore we should be able to find the inverse of each.

Examples:

- a. $y = \log_8 x$ b. $y = \log(x) + 6$

