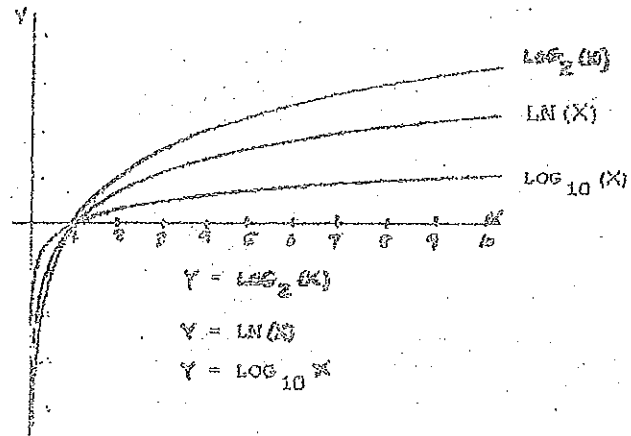
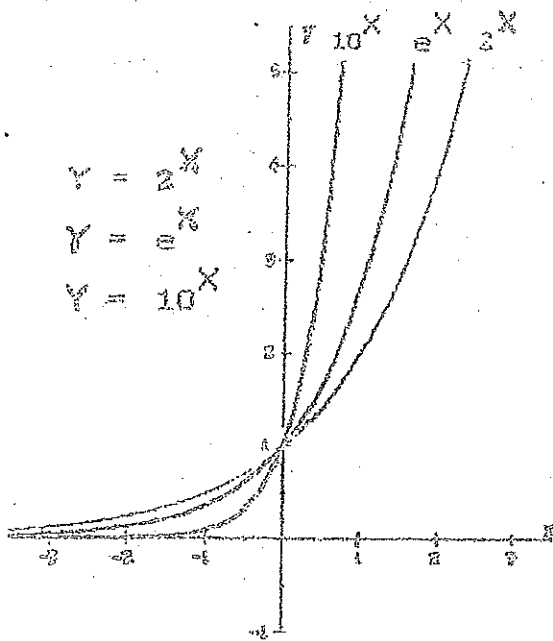


# Exponential and Logarithmic Functions Summary

$$f(x) = a^x$$

$$f^{-1}(x) = \log_a x$$



Domain:  $(-\infty, \infty)$   
 Range:  $(0, \infty)$   
 x-intercept: None  
 y-intercept:  $y = 1$   
 Always increasing

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Compound Interest:  $A = P\left(1 + \frac{r}{n}\right)^{nt}$  or  $A = Pe^{rt}$

## Properties of Logarithms

$$\log_a x = y \Leftrightarrow a^y = x$$

Change of Base Formula

I  $\log xy = \log x + \log y$

$$\log_a x = \frac{\log_b x}{\log_b a}$$

II  $\log \frac{x}{y} = \log x - \log y$

example:  $\log_2 x = \frac{\log_{10} x}{\log_{10} 2}$

III  $\log x^n = n \log x$

Definition:  $\ln x = \log_e x$

Caution!!!  $\log(x + y) \neq \log x + \log y$