

4.3-Logarithmic Functions

Definition: A *logarithmic function* is defined as follows:

If $y = \log_a x$, then

$y = \ln x$ implies

Properties of Logarithms:

$$\log_a(XY) =$$

$$\log_a\left(\frac{X}{Y}\right) =$$

$$\log_a(X^n) =$$

Examples:

Rewrite $\log_4 16 = 2$ as an exponential equation.

Compute $\log_2 \frac{1}{32}$

Compute $\log_9 27$

Given $\log_5 x = -3$, find x

Rewrite $\ln X - 2 \ln Y + \frac{1}{2} \ln Z$ as a single logarithm

Compute $5 \log 2 + 2 \log 5 - \log 8$

Find the inverse of $f(x) = e^{\frac{1}{x}}$

Graphs of Logarithmic Functions:

Examples:

Solve for x : $\log(2 - x) + \log(5 - x) = 1$

$$\lim_{x \rightarrow -\infty} \ln(e^x + e^{-x}) - \ln(2e^x + e^{-x})$$

The formula to compute the amount of money A in an account earning $100r\%$ interest compounded m times per year after t years is $A = P \left(1 + \frac{r}{m}\right)^{mt}$. If 10,000 QR are kept at 6% per year compounded monthly, when will the account have 15,000 QR?

The *Change of Base* formula: