6.3 Evaluating Logarithmic Functions

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$f(x) = a^x$ (a: base #) $\qquad f(x) = \log_a(x)$ (a: base #)

Conversion: (alphabetical order)

$\log_a(h) = s \rightarrow a^s = h$

a: base # | s: solution of logarithm | a: base # | s: exponent | h: value

ex $\log_2(8) = 3 \rightarrow 2^3 = 8$

h: value | s: exponent | 2: base # | 8: value

$\log_5(25) = 2 \rightarrow 5^2 = 25$

ex $\log_3(9) = 2 \rightarrow 3^2 = 9$

$\log_{36}(6) = \frac{1}{2} \rightarrow 36^{\frac{1}{2}} = 6$ ($\sqrt{36} = 6$)

$\log_4(1) = 0 \rightarrow 4^0 = 1$

$\log\left(\frac{1}{100}\right) = -2 \rightarrow 10^{-2} = \frac{1}{100}$ (10: base #)

Special Logarithms:

1. Base 10 ~~$\log_{10}$~~ $\log$
2. Base e ~~$\log_e$~~ $\ln$ (Natural Log)

Properties of Logarithms:

1. $\log_a(1) = 0 \rightarrow a^0 = 1$
2. $\log_a(a) = 1 \rightarrow a^1 = a$
3. $\log_a(a^x) = x \rightarrow a^{\boxed{x}} = a^x$

④ $a^{\log_a(x)} = x$

$4^{\log_4(8)} = 8$

⑤ $\log_a(x) = \log_a(y)$

$x = y$

$3^{x-4} = 3^5$

$x - 4 = 5$