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22.2 The Common Logarithm Function

Common Logarithm – Has the form $y = \log(x)$ where $x > 0$.

$y = \log(x)$ can be rewritten as an exponent as $10^y = x$.

Ex #1 Turn the exponential equation into a logrithmic equation.

a) $10^4 = 10{,}000$ $\quad \log 10{,}000 = 4$

b) $10^{-1} = \frac{1}{10}$ $\quad \log \frac{1}{10} = -1$

c) $10^7 = 10{,}000{,}000$ $\quad \log 10{,}000{,}000 = 7$

d) $10^0 = 1$ $\quad \log 1 = 0$

e) $10^m = n$ $\quad \log n = m$

Ex #2 Turn the logrithmic equation into an exponential equation.

a) $\log 100{,}000 = 5$ $\quad 10^5 = 100{,}000$

b) $\log \frac{1}{100} = -2$ $\quad 10^{-2} = \frac{1}{100}$

c) $\log 10 = 1$ $\quad 10^1 = 10$

d) $\log \frac{1}{1{,}000{,}000} = -6$ $\quad 10^{-6} = \frac{1}{1{,}000{,}000}$

e) $\log a = b$ $\quad 10^b = a$

Ex #3 Evaluate without a calculator.

a) $\log 1000 = ?$ $\quad 10^? = 1000$ $\quad ? = \boxed{3}$

b) $\log \frac{1}{10{,}000} = ?$ $\quad 10^? = \frac{1}{10{,}000}$ $\quad ? = \boxed{-4}$

c) $\log 10^6 = ?$ $\quad 10^? = 10^6$ $\quad ? = \boxed{6}$

d) $\log \frac{1}{1{,}000{,}000} = \boxed{-6}$

e) $\log \frac{1}{100} = \boxed{-2}$

Ex #4 Evaluate with a calculator.

a) $\log 3.7 \approx 0.568$

b) $\log \frac{1}{4} \approx -0.602$

c) $\log 0 =$ Not a real #

d) $\log 100 = 2$

e) $\log(-2) =$ Not a real #

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