Exponential and Logarithmic Properties *"Remember, a Logarithm is an exponent."*

$\text{Base}^{\text{exponent}}$ = result $\qquad$ Log_{Base} Result = Exponent

$b^x = y \qquad \log_b y = x$

$10^x = y \qquad \log y = x$

$e^x = y \qquad \ln y = x$

$b^x \cdot b^y = b^{x+y} \qquad \log_b xy = \log_b x + \log_b y$

$\frac{b^x}{b^y} = b^{x-y} \qquad \log_b \frac{x}{y} = \log_b x - \log_b y$

$(b^x)^y = b^{x \cdot y} \qquad \log_b x^y = y \cdot \log_b x$,

$b^x = b^x \qquad \log_b b^x = x$

if $b^x = b^y$, then $x = y$ $\qquad$ if $\log_b x = \log_b y$, then $x = y$

Change of base: $\log_b a = \frac{\log a}{\log b}$

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

Other Exponential and Radical Properties: $\qquad$ $\mathbf{b^0 = 1}$

$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n = \frac{b^n}{a^n}$, $\quad b^{\frac{x}{y}} = \sqrt[y]{b^x}$, $\quad b^{1/2} = \sqrt{b}$, $\quad \sqrt[even\#]{negative\#} =$ No Real Solution.

if $x^{\frac{a}{b}} = number$, then $x = (number)^{b/a}$ and similarly if $x^{-a/b} = \#$, then $x = (\#)^{-b/a}$

When simplifying radicals: $\sqrt[n]{x^n} = x$ $\qquad$ Also: $a\sqrt[n]{b} + c\sqrt[n]{b} = (a+c)\sqrt[n]{b}$

Other Properties or Formulas

If $x^2 = a$, then $x = \pm\sqrt{a}$, $\qquad$ if $ax^2 + bx + c = 0$, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$,

If $x^2 = -a$, then x = no real solution or $x = \pm i\sqrt{a}$. Where $i = \sqrt{-1}$, $i^2 = -1$, $i^3 = -i$, $i^4 = 1$, ...

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