Rules for Exponents and Radicals

An exponent problem is simplified when each base is represented only once, and there are no negative exponents in the problem.

$$a^n a^m = a^{n+m}$$

$$\frac{a^n}{a^m} = a^{n-m} \qquad a \neq 0$$

$$(a^n)^m = a^{n \cdot m}$$

$$(ab)^n = a^n b^n \qquad b \neq 0$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n} \qquad b \neq 0$$

$$a^0 = 1$$

$$a^{-n} = \frac{1}{a^n} \qquad a \neq 0$$

$$\frac{1}{a^{-n}} = a^n$$

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n \qquad a \neq 0\,, b \neq 0$$

$$Let\text{ "a" be a positive \#} \begin{cases} \sqrt[n]{-a} = -\sqrt[n]{a}\ , if\ n\ is\ odd \\ \sqrt[n]{-a} = Complex\ \#, if\ n\ is\ even \end{cases}$$

$$a^{1/n} = \sqrt[n]{a}$$

$$a^{m/n} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$$

$$\sqrt[n]{a^n} = |a|\ if\ n\ is\ even$$

$$\sqrt[n]{a^n} = a\ if\ n\ is\ odd$$

$$\sqrt[n]{ab} = \sqrt[n]{a}\sqrt[n]{b}$$

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

$$\sqrt[n]{a+b} \neq \sqrt{a} + \sqrt{b}$$

$$i = \sqrt{-1}$$

$$i^2 = -1$$

$$i^3 = -i$$

$$i^4 = 1$$

Fall 2012

Math 2

Logs and Lns

$\log_b(x) = y \Leftrightarrow b^y = x$

$\dfrac{\log(x)}{\log(b)} = y \Leftrightarrow b = \sqrt[y]{x}$

$\log_b(1) = 0$

$\log_b(b) = 1$

$\log_b(b^x) = x$

$b^{\log_b(x)} = x$

$\ln(x) = \log_e(x)$

$\ln(x) = y \Leftrightarrow e^y = x$

$e = 2.718281828459...$

$\ln(1) = 0$

$\ln(e) = 1$

$\ln(e^x) = x$

$e^{\ln(x)} = x$

$\log_b(AB) = \log_b(A) + \log_b(B)$

$\log_b\left(\dfrac{A}{B}\right) = \log_b(A) - \log_b(B)$

$\log_b(A^C) = C \times \log_b(A)$