ANOKA-RAMSEY COMMUNITY COLLEGE
Math Skills Center
Exponents

$\boldsymbol{x^0 = 1 \quad and \quad x^1 = x}$

$ex\!: 5^0 = 1 \quad and \quad 5^1 = 5$

$\boldsymbol{x^m \cdot x^n = x^{m+n}}$

$ex\!: x^3 \cdot x^2 \to x^{3+2} \to x^5$

$\boldsymbol{\frac{x^m}{x^n} = x^{m-n}}$

$ex\!: \frac{x^5}{x^2} \to x^{5-2} \to x^3$

$\boldsymbol{(x^m)^n = x^{mn}}$

$ex\!: (x^5)^2 \to x^{5\cdot 2} \to x^{10}$

$\boldsymbol{x^{-m} = \frac{1}{x^m} \quad or \quad \frac{1}{x^{-n}} = x^n}$

$ex\!: x^{-3} \to \frac{1}{x^3} \ or \ \frac{1}{x^{-4}} = x^4$

$\boldsymbol{\left(\frac{c}{x^m}\right)^n = \frac{c^n}{x^{m\cdot n}}}$

$ex\!: \left(\frac{2}{x^5}\right)^3 \to \frac{2^3}{x^{5\cdot 3}} \to \frac{8}{x^{15}}$

$\boldsymbol{\sqrt[n]{x^m} = (x^m)^{\frac{1}{n}} = x^{\frac{m}{n}}}$

$ex\!: \sqrt{3} \to 3^{\frac{1}{2}} \ and$

$ex\!: \sqrt[3]{5^2} \to (5^2)^{\frac{1}{3}} \to 5^{\frac{2}{3}}$

$\boldsymbol{If \ a^r = a^s, then \ r = s}$

$ex\!: 3^x = 3^5, then \ x = 5$

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Logarithms

$\log_b x = y$ ex: $\log_3 x = 2$

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$If\ \log_b u = \log_b v, then\ u = v$

ex: $\log_2 x = \log_2 7, then\ x = 7$

$\log_b b = 1$ ex: $\log_3 3 = 1$

$\log_b 1 = 0$ ex: $\log_5 1 = 0$

$\log_b uv = \log_b u + \log_b v$

ex: $\log_2 7x = \log_2 7 + \log_2 x$

$\log_b \frac{u}{v} = \log_b u - \log_b v$

ex: $\log_3 \frac{2}{x} = \log_3 2 - \log_3 x$

$\log_b u^n = n \log_b u$

ex: $\log_4 x^3 = 3\log_4 x$

$\log_b u = \frac{\log_c u}{\log_c b}$ ex: $\log_3 5 = \frac{\log_{10} 5}{\log_{10} 3}$

$b^{\log_b u} = u$ ex: $3^{\log_3 5} = 5$

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