Formula Sheet for College Algebra Final Exam

Properties of Exponents 1. $a^n a^m = a^{n+m}$ 2. $\frac{a^n}{a^m} = a^{n-m}$ 3. $(a^n)^m = a^{nm}$ 4. $(a^n b^m)^p = a^{np} b^{mp}$ 5. $\left(\frac{a^n}{b^m}\right)^p = \frac{a^{np}}{b^{mp}}$ 6. $b^{-p} = \frac{1}{b^p}$	Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Circle $(x-h)^2 + (y-k)^2 = r^2$ $center = (h,k)$ $radius = r$ Vertex of Parabola $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$ $f(x) = a(x-h)^2 + k$ $Vertex \quad at \quad (h,k)$	Standard Form of Equation of Parabola $(x-h)^2 = 4p(y-k)$ $vertex = (h,k)$ $focus = (h, k+p)$ $directrix: y = k - p$ $(y-k)^2 = 4p(x-h)$ $vertex = (h,k)$ $focus = (h+p, k)$ $directrix: x = h - p$
Properties of Logarithms 1. $y = \log_b x \quad iff \quad b^y = x$ 2. $\log_b b = 1$ 3. $\log_b b^p = p$ 4. $\log_b 1 = 0$ 5. $b^{\log_b p} = p$	6. $\log_b m^p = p \log_b m$ 7. $\log_b (mn)$ $= \log_b m + \log_b n$ 8. $\log_b \left(\frac{m}{n}\right)$ $= \log_b m - \log_b n$	9. $\log(a) = \log_{10}(a)$ 10. $\ln(a) = \log_e(a)$ Change of Base Formula $\log_b x = \frac{\log_{10} x}{\log_{10} b} = \frac{\ln x}{\ln b}$
Properties of Radicals 1. $\left(\sqrt[n]{b}\right)^m = \sqrt[n]{b^m} = b^{\frac{m}{n}}$ 2. $\sqrt[n]{a}\sqrt[n]{b} = \sqrt[n]{ab}$ 3. $\sqrt[m]{\sqrt[n]{b}} = \sqrt[mn]{b}$ 4. $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}, b \neq 0$	Absolute Value Inequalities $\lvert E \rvert \leq k \quad iff \quad -k \leq E \leq k$ $\lvert E \rvert \geq k \quad iff$ $E \leq -k \quad or \quad E \geq k$ Midpoint Formula $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	Distance Formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ Equations for Graphing Lines $m = \frac{y_2 - y_1}{x_2 - x_1}, y = mx + b$ $y - y_1 = m(x - x_1)$
Interest Formulas *compound* $A = P\left(1 + \frac{r}{n}\right)^{nt}$ *continuous* $A = Pe^{rt}$		

Remainder Theorem: For any Poly. P(x), the remainder obtained when dividing P(x) by x - r is P(r).

Rational Root Theorem: Let $P(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots + a_1 x + a_0$, where all coefficients are integers and n is a positive integer. If $\frac{c}{d}$ is a root of P(x) then c is a factor of a_0 and d is a factor of a_n