

Formulas

Exponents

$$a^0 = 1$$

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

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

$$(a^n)^m = a^{mn}$$

$$(ab)^n = a^n b^n$$

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

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$$

Product/factors

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

$$a^2 - b^2 = (a - b)(a + b)$$

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Radicals

$$\sqrt[n]{xy} = \sqrt[n]{x} \sqrt[n]{y}$$

$$\sqrt[n]{\frac{x}{y}} = \frac{\sqrt[n]{x}}{\sqrt[n]{y}}$$

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

Square Root Property

If $X^2 = k$ and $k \geq 0$ then $X = \pm k$.

Quadratic formula

$$\Delta = b^2 - 4ac, \frac{-b \pm \sqrt{\Delta}}{2a}$$

Parabolas

x -coordinate of vertex $x_v = \frac{-b}{2a}$

lines

General formula $Ax + By = C$

Standard formula $y = mx + b$

Point slope formula $y - y_1 = m(x - x_1)$

$$\text{slope } m = \frac{y_2 - y_1}{x_2 - x_1}$$

distance and midpoint

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Logarithms

$\log_b y = x$ if and only if $b^x = y$

$\log_a a = 1, \log_a 1 = 0, \log_a a^x = x$

$$\log_b y = \frac{\log y}{\log b}$$