ALGEBRA FORMULAS

BASIC EXPRESSION

Basic Expression: $ax + b$

Linear Equation: $ax + b = 0$

Quadratic Equation:
$ax^2 + bx + c = 0$

Quadratic Formula: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Discriminant: $D = b^2 - 4ac$

Sum of Roots: $-\dfrac{b}{a}$

PRODUCT OF ROOTS

Product of Roots: $\dfrac{c}{a}$

Identity 1: $(a+b)^2 = a^2 + 2ab + b^2$

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

Identity 3: $(a+b)(a-b) = a^2 - b^2$

Identity 4:
$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

Identity 5:
$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

FACTORIZATION

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

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

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

Slope Formula: $\dfrac{y_2 - y_1}{x_2 - x_1}$

Equation of Line: $y = mx + c$

Point-Slope Form:
$y - y_1 = m(x - x_1)$

DISTANCE FORMULA

Distance Formula:
$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Midpoint Formula: $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

Inequality Rule:
If $a > b$ then $a + c > b + c$

Exponent Rule 1: $a^m \times a^n = a^{m+n}$

Exponent Rule 2: $\dfrac{a^m}{a^n} = a^{m-n}$

Exponent Rule 3: $(a^m)^n = a^{mn}$

EXPONENT RULE 4

Exponent Rule 4: $a^0 = 1$

Log Rule 1: $\log(ab) = \log a + \log b$

Log Rule 2: $\log\left(\dfrac{a}{b}\right) = \log a - \log b$

Log Rule 3: $\log(a^b) = b \log a$