

Algebra Rules Cheat Sheet

Thistle & Rose Homeschool Consulting — free printable

Exponents

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

$$a^m / a^n = a^{(m-n)}$$

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

$$a^0 = 1 \quad (a \text{ not } 0)$$

$$a^{(-n)} = 1 / a^n$$

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

Radicals

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

$$\sqrt{a/b} = \sqrt{a} / \sqrt{b}$$

$$a^{(1/n)} = \text{nth root of } a$$

$$a^{(m/n)} = (\text{nth root of } a)^m$$

Factoring

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

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

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

$$x^2 + (p+q)x + pq = (x+p)(x+q)$$

Quadratic formula

For $ax^2 + bx + c = 0$:

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

Discriminant $b^2 - 4ac$: positive = 2 real roots,

zero = 1 root, negative = no real roots

Lines

Slope: $m = (y_2 - y_1) / (x_2 - x_1)$

Slope-intercept: $y = mx + b$

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

Parallel lines: same slope

Perpendicular lines: slopes multiply to -1

Absolute value & inequalities

$|x| < a$ means $-a < x < a$

$|x| > a$ means $x < -a$ or $x > a$

Flip the sign when multiplying or
dividing both sides by a negative number

Logarithms

$$\log(ab) = \log a + \log b$$

$$\log(a/b) = \log a - \log b$$

$$\log(a^n) = n \log a$$

$$\log \text{ base } b \text{ of } x = \ln x / \ln b$$