

Math 016 Formulas

$$\text{Slope: } m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Slope-Intercept Equation of a Line: $y = mx + b$

Parallel slope: equal

$$\text{Perpendicular slope: } m_{\perp} = \frac{-1}{m}$$

Horizontal Line: $y = b$

Vertical Line: $x = a$

Perfect Square Trinomials:

$$1. \quad a^2 + 2ab + b^2 = (a + b)^2$$

$$2. \quad a^2 - 2ab + b^2 = (a - b)^2$$

Difference of Two Squares:

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

Sum of Two Cubes:

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

Difference of Two Cubes:

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

Distance Formula:

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

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

Exponent Rules:

$$1. \quad a^m a^n = a^{m+n}$$

$$2. \quad \frac{a^m}{a^n} = a^{m-n}$$

$$3. \quad (a^m)^n = a^{mn}$$

$$4. \quad (ab)^n = a^n b^n$$

$$5. \quad \left(\frac{a}{b} \right)^n = \frac{a^n}{b^n}$$

Square Root Property: If $x^2 = k$ then $x = \pm\sqrt{k}$

Quadratic Formula: If $ax^2 + bx + c = 0$ then

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

Direct Variation: $y = kx$

Inverse Variation: $y = \frac{k}{x}$

Joint Variation: $y = kxz$

Things to Know:

Graph a function.

Find the equation of a line given two points.

Find the equation of a line parallel or perpendicular given original line and a point.

Solve a system of linear equation using substitution and/or elimination.

Factor.

Solve a quadratic: set equal to zero, then factor.

Reduce, multiply, divide, add, and subtract fractions.

Solve an equation with one or more fractions: multiply all numerators by the lcd and reduce.

Solve word problems with fractions.

Simplify complex fraction: multiply by the lcd over the lcd.

Solve variation problems.

Solve inequalities and write answer in interval notation.

Absolute Value Equations: if $|x| = k$, rewrite as $x = k$ or $x = -k$

Absolute Value Inequalities:

If $|x| > k$, rewrite as $x > k$ or $x < -k$, interval notation: $(-\infty, -k)$ or (k, ∞)

If $|x| < k$, rewrite as $-k < x < k$, interval notation: $(-k, k)$

Graph linear inequalities: graph line, decide solid or dotted line, pick a point *not* on the line and test.

Rewrite a radical as an exponent.

Simplify a radical.

The conjugate of $a + b\sqrt{c}$ is $a - b\sqrt{c}$ and the conjugate of $a + bi$ is $a - bi$

To rationalize: multiply top and bottom by the conjugate of the denominator.

Solve a radical equation: isolate radical, square/cube both sides, check answers.

Add, subtract, multiply, and divide with complex numbers.

Simplify powers of i .

Solve quadratics with the quadratic formula.