

Algebraic Properties

Commutative

$$a + b = b + a$$

$$a \cdot b = b \cdot a$$

Associative

$$a + (b + c) = (a + b) + c$$

$$a \cdot (b \cdot c) = (a \cdot b) \cdot c$$

Identity

$$a + 0 = a$$

$$a \cdot 1 = a$$

Inverse

$$a + (-a) = 0$$

$$\frac{a}{b} \cdot \frac{b}{a} = 1; b \neq 0$$

Zero-Product

$$a \cdot 0 = 0$$

If $ab = 0$, then a or b equals zero

Distributive

$$a(b + c) = ab + ac$$

$$a(b - c) = ab - ac$$

Linear Equations

Slope Formula

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

Point-Slope Form

$$y - y_1 = m(x - x_1)$$

Slope-Intercept Form

$$y = mx + b$$

Standard Form

$$Ax + By = C$$

Horizontal Lines Vertical Lines

$$y = b$$

$$x = a$$

Quadratic Functions

Standard Form

$$y = ax^2 + bx + c$$

Vertex Form

$$y = a(x - h)^2 + k$$

Properties of Equality

For all real numbers a , b , and c

Addition Property of Equality

If $a = b$, then $a + c = b + c$

Multiplication Property of Equality

If $a = b$, then $ac = bc$

Symmetry

If $a = b$, then $b = a$

Reflexive

$$a = a$$

Substitution

If $a = b$, then b can replace a in expressions and equations.

Exponential Functions

$$y = ab^x + k$$

$$y = a(1 \pm r)^t$$

Figures and Formulas:

Perimeter (P), Area (A), Volume (V), and Surface Area (SA)

Rectangle

$$A = lw \text{ or } A = bh$$

$$P = 2l + 2w \text{ or } P = 2(l + w)$$

Triangle

$$A = \frac{1}{2}bh \text{ or } A = \frac{bh}{2}$$

Rectangular Prism

$$V = lwh$$

$$SA = 2lw + 2wh + 2lh$$

Other Formulas

$$|x| = \sqrt{(x)^2}$$

$$x^{\frac{1}{a}} = \sqrt[a]{x}$$

$$a_n = a_1 + d(n - 1)$$

Exponent Rules

Where a , b , and c are rational numbers and $a \neq 0$

$$1. \quad a^b a^c = a^{b+c}$$

$$2. \quad (a^b)^c = a^{b \cdot c}$$

$$3. \quad (ab)^c = a^c b^c$$

$$4. \quad a^b = \frac{1}{a^{-b}} \text{ or } a^{-b} = \frac{1}{a^b}$$

$$5. \quad a^0 = 1$$

$$6. \quad \left(\frac{a}{b}\right)^c = \frac{a^c}{b^c}$$

$$7. \quad \frac{a^b}{a^c} = a^{b-c} \text{ or } \frac{1}{a^{c-b}}$$

$$8. \quad a^{\frac{n}{d}} = \sqrt[d]{a^n}$$

Common Conversions

1 hour (hr) = 60 minutes (min)

1 minute (min) = 60 seconds (sec)

1 day = 24 hours (hr)

1 year (yr) = 365 days

1 foot (ft) = 12 inches (in)

1 yard (yd) = 3 feet (ft)

1 mile (mi) = 5,280 feet (ft)

1 pound (lb) = 16 ounces (oz)

1 Tablespoon (Tbsp) = 3 teaspoons (tsp)

3 teaspoons (tsp) = 15 milliliters (mL)

1 Tablespoon (Tbsp) = 15 milliliters (mL)

1 gallon (gal) = 4 quarts (qt)

1 quart (qt) = 2 pint (pt)

1 pint (pt) = 2 cups (c)

1 ton = 2,000 pounds (lb)

1 Liter (L) = 1,000 milliliters (mL)

1 meter (m) = 100 centimeters (cm)

1 inch (in) = 2.54 centimeters (cm)