

Common Algebraic Expressions

This handout contains common algebraic expressions that can help guide you through formulas and algebraic concepts. For additional assistance with Algebra, make an appointment with an AAC Tutor.

Addition and Subtraction of Fractions

$$\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b} \quad b \neq 0$$

$$\frac{a}{b} - \frac{c}{b} = \frac{a - c}{b} \quad b \neq 0$$

Addition of Real Numbers

$$(+3) + (+4) = +7$$

$$(-3)+(-4)=-7$$

$$(-3)+(+4)=+1$$

Properties of Addition

Commutative Property of Addition

$$a + b = b + a$$

Associative Property of Addition

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

Properties of Multiplication

Commutative Property of Multiplication

ab = ba

Associative Property of Multiplication

(ab)(c) = (a)(bc)

Function Notation

The function notation f(x) is read "f of x."

f(x) represents a unique output (range) value for each input (domain) value of x. $f(x) \neq f \cdot x$

Δ Greek symbol to represent change

Slope = m

Two points on a line (x_1,y_1) (x_2,y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad x_1 \neq x_2 \qquad m = \frac{\Delta y}{\Delta x}$$

Strategy for Solving Word Problems

Step 1 Read the problem carefully to determine what you are being asked to find.

Step 2 Select a variable to represent each unknown quantity. Specify precisely what each variable represents, and note any restrictions on each variable.

Step 3 If necessary, make a sketch and translate the problem into a word equation or a system of word equations. Then translate each word equation into an algebraic equation.

Step 4 Solve the equation or system of equations, and answer the question completely in the form of a sentence.

Step 5 Check the reasonableness of your answer.

Over \rightarrow

Slope-Intercept Form Point-Slope Form		 n	Rate Principle
$y = mx + b$ $y - y_1 = m(x - x_1)$			Amount = Rate X Base A= R · B
y-intercept = (0, b) passes through the		he point (x ₁ , y ₁) with slope	Variable Cost = Cost per item X Number of items
$y = \frac{1}{2}x + 3$ Example:			Interest = Principle invested X Rate X Time
$\frac{1}{2}$ = slope $y - 1 = \frac{1}{3}(x - 1)$			Or I = P · R for T = 1
(0, 3) = y-intercept		he point (1, 1) with slope	Distance = Rate X Time
		ne pome (1) 1/ mai siope	Work = Rate X Time
Raising Products and Quotients to a Power $(xy)^{m} = x^{m} \cdot y^{m} \qquad (3x^{3})^{2} = 3^{2}(x^{3})^{2} = 9x^{6}$ $\left(\frac{x}{y}\right)^{m} = \frac{x^{m}}{y^{m}} \qquad \left(\frac{3}{x^{3}}\right)^{2} = \frac{3^{2}}{(x^{3})} = \frac{9}{x^{6}}$		Product Rule for	Notes
		Exponents $x^{m} \cdot x^{n} = x^{m+n}$	
		$2^3 \cdot 2^2 = 2^{3+2} = 2^5 = 32$	
		Power Rule for	
		Exponents $(x^m)^n = x^{mn}$	
		$(2^3)^2 = 2^{3(2)} = 2^6 = 64$	
Exponential Notation		Zero Exponents	
$b^n = b \cdot b \cdot b $ n times $x^y = x \cdot x \cdot x $ x times		$X^0 = 1$	
$2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = 16$ $5^3 = 5 \cdot 5 \cdot 5 = 125$		$12542^0 = 1$ $5^0 = 1$	
		$x^0 + y^0 = 1 + 1 = 2$	
Quotient Rule for	Negative Exponents	Fraction to a Negative	
Exponents	v-n _ <u>1</u>	Exponent	
$\frac{x^m}{x^n} = x^{m-n}$	$X^{-n} = \frac{1}{x^n}$	$\left(\frac{x}{y}\right)^{-n} = \left(\frac{y}{x}\right)^n$	
$\frac{2^4}{2^2} = 2^{4-2} = 2^2 = 4$	$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$	$\left(\frac{4}{5}\right)^{-3} = \left(\frac{5}{4}\right)^3$	

Hall, James W., and Brian A. Mercer. *Beginning and Intermediate Algebra: The Language and Symbolism of Mathematics*. New York: McGraw-Hill, 2011. Print.

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