Chapter 2: Algebraic Expressions & Exponents

ALGEBRAIC EXPRESSIONS

Addition and Subtraction

Only like terms can be added or subtracted. Like terms have the same variable and exponent on the variable (e.g. 13, 5, and 2 are like terms; x, 3x, and 5x are like terms; $5x^2$ and $2x^2$ are like terms.) To combine like terms: add or subtract the numerical coefficients and keep the variable part the same. No numerical coefficient in front of the variable means a coefficient of 1.

$3x + 3 + 4x + x$ .... the three terms with x's are like terms
$= (3 + 4 + 1)x + 3$ .... add the numerical coefficients of the like terms
$= 8x + 3$

Simplification involving brackets. To remove the brackets, use the following rules:

- (+) sign or no sign in front of the brackets: drop the brackets and copy the terms inside the brackets with signs unchanged. $(-7a + 5b - c)$ becomes $-7a + 5b - c$
- (−) sign in front of the brackets: drop the brackets and change the sign of every term inside the brackets. $-(-7a + 5b - c)$ becomes $7a - 5b + c$

Multiplication and Division

- To find the product of two or more single terms (monomials), find the product of the numerical coefficients and multiply by the product of their variables.
  $5b (2b)$
  $= (5 \times 2) (b \times b)$ .... obtain the products of the numerical coefficients and the variables
  $= 10 \times b^2 = 10b^2$
- To find the product of a polynomial (multiple terms) and a monomial, multiply each term of the polynomial by the monomial.
  $-2a (5a - 3b)$
  $= (-2a)(5a) - (-2a)(3b)$ .... multiply each term by $(-2a)$
  $= -10a^2 + 6ab$
- To find the product of two polynomials, multiply each term of the first polynomial by each term of the other polynomial and then simplify by combining like terms).
  $(a + 2)(2a - 3)$ each term of the first polynomial is multiplied
  $= a(2a - 3) + 2(2a - 3)$ .... by the second polynomial
  $= 2a^2 - 3a + 4a - 6$ .... carry out the multiplication
  $= 2a^2 + a - 6$ .... simplify
- To divide monomials, divide the numerical coefficients and the variables separately. Then multiply the answers.
  $12ab \div 6b = \left(\frac{12}{6}\right)\left(\frac{ab}{b}\right) = 2a$
- To divide a polynomial by a monomial, divide each term of the polynomial by the monomial.
  $(12a + 8) \div 4 = \frac{12a + 8}{4} = \frac{12a}{4} + \frac{8}{4} = 3a + 2$

Authored by Gordon Wong