

Algebra

Algebraic expressions often look like long lines of numbers and letters:

- ✓ This expression has 3 distinct parts. Each of these parts is called a TERMS and they are separated by + or - signs.
- ✓ As you can see, there are two distinct parts to every term, the 'number part' and the 'letter part'.
- ✓ The COEFFICIENT refers to the number (with its sign). It is always written to the left of the letters. Note that the term 'c' has no number. When a variable is written with no coefficient, the coefficient is always '1'. A '+c' has a coefficient of '+1'.
- ✓ The VARIABLE refers to the letter(s) and their respective powers. It is written to the right of the coefficient, usually in alphabetical order. eg. x or $2x$ or $3ab$ $abc+def$ eg. x^2+x-1
- ✓ An expression with one term is called a MONOMIAL, two terms BINOMIAL, three terms TRINOMIAL, more than three terms POLYNOMIAL.
 eg. $x+2$ $2x+1$ $3a-5ab+b$
 $x+y+z+4$ MONO MONO MONO

TERM	$4x$	$-3c^2d^4$	$-6ba^3$	9	$-y = -1y$	$1 \cdot a$
COEFFICIENT	$+4$	-3	-6	CONSTANT	-1	$+1$
VARIABLE(S)	x	c^2, d^4	b and a^3	—	y	a

Of the above terms, 4 are 'variable' terms and 1 is a 'constant' term. The term, 9, is called a constant term because it is always 9. (CONSTANTLY 9)

Like and Unlike Terms

$2x, -121x, 5x, x,$ and $-2x$ are all 'like terms' since their variables are all THE SAME (x).

$9xy^2, 5y^2x, -10xy^2, xy^2, -y^2x$ are ALSO like terms because their variables are all EQUAL (when put in alphabetical order).

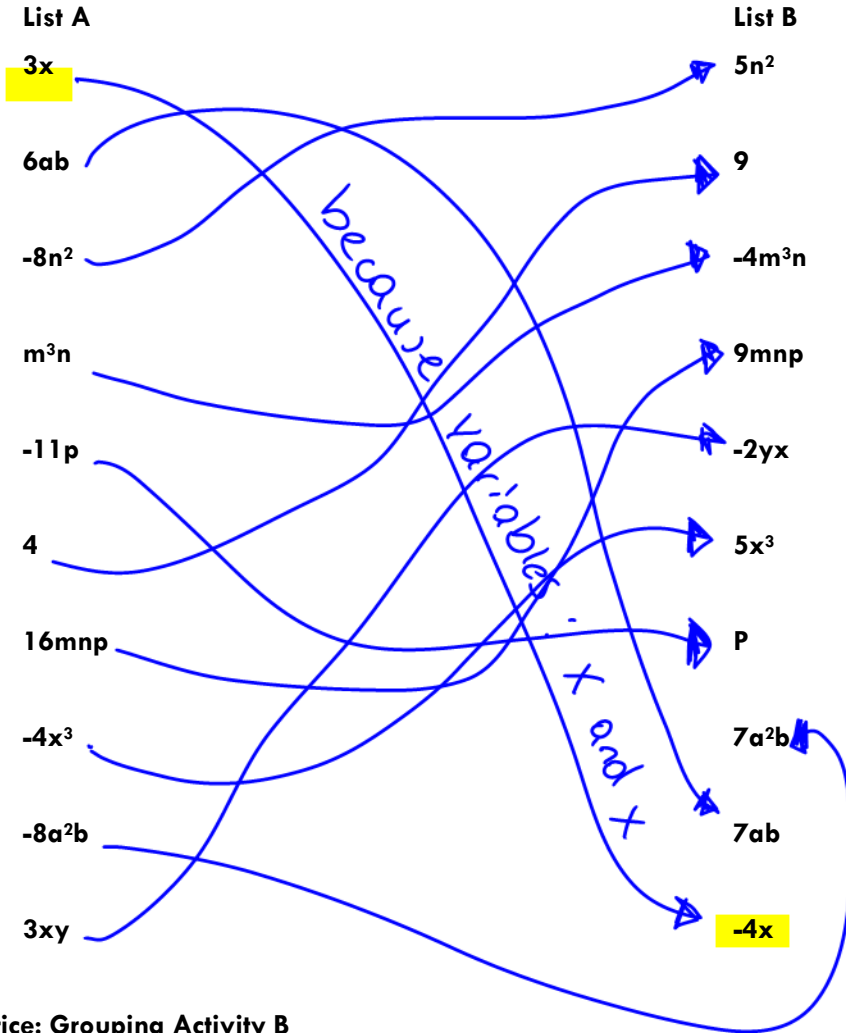
$9xy^2$ and $5xy^2$

$2x^2$ and $4x$ are 'UNLIKE TERMS' because the variables x and x^2 are not the same.

Terms can only be added or subtracted if they are 'LIKE TERMS'. Unlike terms can not be added or subtracted.

Practice: Matching Game A

- Using a line, connect the like terms (one from list A and one from list B).
- Remember, like terms have the exact same variables with the exact same exponents. Only the coefficients can be different.



Practice: Grouping Activity B

- Circle all the monomials. Underline all the binomials. Draw a rectangle around the trinomials.

3a + 4b - c TRI

n² - 3t BI

t + 8 + ju + t² POLY

4m - k BI

(-a²) MONO

(5xy²) MONO

r² - r - 12n⁷ TRI

(1/2y) MONO

5t - y + 6r TRI

3x + 3 BI

1 - 6y BI

(xy) MONO

(0.9mn²) MONO

4m + 2n + 4k - 3 + r POLY

2xy² - 3x + 5 TRI

count (+, -) between operation sign, add 1

Collecting (Adding Like Terms)

To simplify an expression by collection like terms, you:

1. Determine which terms are like
2. Rearrange (optional) *remember the sign (+/-) stays with the term
3. Add the coefficients *remember the sign (+/-) stays with the term
4. Keep the variable the same

Example A

$$1x + 3x - 5 + 7x - 4x + 2$$

$$= 1x + 3x + 7x - 4x - 5 + 2$$

$$= 7x - 3$$

Example B

$$= 1x^2 + 3x + 7x - 2x^2 + 2 + 4$$

Mark like terms

$$= 1x^2 - 2x^2 + 3x + 7x + 2 + 4$$

$$= -1x^2 + 10x + 6$$

Practice: Simplify the following expressions by collecting like terms

a. $3y + y^2 - 6y^2 + 7 - 4y + 3y - 2y - 1$

$$= y^2 - 6y^2 + 3y - 4y + 3y - 2y + 7 - 1$$

$$= -5y^2 + 6$$

b. $b - 3b + 7 - 4b - 3$

$$= b - 3b - 4b + 7 - 3$$

$$= -6b + 4$$

c. $5h + 5h^2 - 5$

$$= 5h^2 + 5h - 5$$

d. $3 + 7 - 2 + 3d - 8d + 7 - 2d^2$

$$= -2d^2 + 3d - 8d + 3 + 7 - 2 + 7$$

$$= -2d^2 - 5d + 15$$

e. $5x - 3x - 7x + 2x$

$$= -3x$$

f. $3x^2 + 5x - 7 - 4x^2 - 5x + 9$

$$= 3x^2 - 4x^2 + 5x - 5x - 7 + 9$$

$$= -x^2 + 2$$

g. $5a^2 - 4a + a^2 - 8a - a$

$$= 5a^2 + a^2 - 4a - 8a - a$$

$$= 6a^2 - 13a$$

h. $2a + b + 6c - 3a + 4b - c$

$$= 2a - 3a + b + 4b + 6c - c$$

$$= -a + 5b + 5c$$

ANSWERS: a) $-5y^2 + 6$, b) $-6b + 4$, c) $5h^2 + 5h - 5$, d) $-2d^2 - 5d + 15$, e) $-3x$, f) $-x^2 + 2$, g) $6a^2 - 13a$, h) $-a + 5b + 5c$