

Algebra: part of mathematics where variables are used to take the place of unknown quantities.

$$3x^2 + 4y = 1$$

Expression

coefficients (#'s in front of variables) → 3, 4

Variables → x, y

constant → 1

Simplifying: to make the expression (or answer) simpler by combining like terms & reorganizing terms

Example: $4a + 5b - 3a^2 + 2b - 6a$

simplify $\Rightarrow -3a^2 - 2a + 7b$

Evaluating: to get a numerical answer.

Example: if $a = 2$ & $b = 3$ from above

$$\begin{aligned} & -3(2)^2 - 2(2) + 7(3) \\ & = -3(4) - 4 + 21 \\ & = -12 - 4 + 21 \\ & = \underline{5} \end{aligned}$$

Solving: find the value of the missing variable.

Example: $A_0 = \pi r^2$ if $r = 3$ what is A_0 ?

$$A_0 = \pi(3)^2$$

$$A_0 = \pi(9) = 9\pi \text{ or } 28.26$$

- Brackets
- Exponents
- Division
- Multiplication
- Addition
- Subtraction

} interchange order
} interchange order

when simplifying or Evaluating

BEDMAS
when solving (reverse direction)

Rules For Solving

- The equal sign (=) separates the equation into 2 sides
- Whenever an operation is performed on one side of the equation, the same operation must be performed on the other side of the equation
- Next, bring ^{all} the variable to one side of equation by using the opposite operation
- Isolate the variable by itself by removing any coefficient attached to the variable.

Example: $5m + 7 - 3m = 5 - 9m$ ① bring variables all to one side and constants to the other

$\xrightarrow{-7}$ $\xrightarrow{+9m}$
 opposite operation

$5m + 9m - 3m = 5 - 7$ ② simplify

$\frac{11m}{11} = \frac{-2}{11}$ ③ remove coefficient

$m = \frac{-2}{11}$

Useful Properties

- Commutative: the order of #'s in an addition or multiplication does not matter.

Examples: $5+2=7$ $5 \times 2=10$
 $2+5=7$ $2 \times 5=10$

- Associative: brackets can be moved to group different terms when adding or multiplying

Example: $2+(3+4)=2+7=9$ ↗
 $(2+3)+4=5+4=9$ ↘ same

$4 \times (5 \times 6) = 4 \times 30 = 120$ ↗
 $(4 \times 5) \times 6 = 20 \times 6 = 120$ ↘ same

- Distributive: when multiplying a sum or difference, you can multiply each quantity within the brackets, then take the sum or difference.

Example: $5(3+4) = 5(3) + 5(4)$
 $= 15 + 20 = \underline{\underline{35}}$

$2(L+W+H) = 2L + 2W + 2H$

Multiplying & Dividing Integers

$(-) \times (-) = (+)$ $(-) \times (+) = (-)$ $(+) \times (-) = (-)$

$(-) \div (-) = (+)$ $(-) \div (+) = (-)$ $(+) \div (-) = (-)$