

Math 200 key words

A) **Reflexivity:** For any number A, $A=A$

B) **Symmetry:** For A&B (numbers) If $A=B$ then $B=A$

C) **Transitivity:** Let A, B, C be numbers: if $A=B$ and $B=C$ then $A=C$

Rational numbers: numbers that can be represented with a finite or decimal expansion.

Ex) -9.333333, 1.242424

Positive whole numbers (Natural Numbers): numbers we use to count.

Ex) 1,2,3,4,5....99...1234....

Zero (neutral element for addition): allows carrying out the operation.

Ex) 0, $m-m=0$

Integer: An Integer is a whole number that is not a fraction. It is complete by itself.

Absolute Value: a positive number can never be negative.

Ex) $|-3| = 3$

Quotient: the result of a division.

Divisor: the number one divides.

Dividend: the other number.

Natural Domain: the largest set which the operation is defined.

Numerator: the number on top.

Denominator: Number on the bottom.

Common Denominator: making both side equal the same bottom.

Common Multiple: a number that multiplied by a certain number to make the bottom the same on both sides.

$$X-5 = 1 \text{ ——— ONE solution } x = 6!$$

$$X = x + 3 \text{ ——— NO solution!}$$

$$2x - 5x = -3x \text{ — Infinitely many solutions}$$

Domain: The set of values over which the unknowns of a given equation are allowed to take values:

Note: ☑ If it's not clear from the context, you need to specify the domain of the equation. The existence of the solution depends on it!

$$y = mx + d$$

m and **d** are constants (fixed numbers) and real numbers!

x and **y** are the two unknowns of the given equation

Note: With this form, it is easier to find the graph of the equation. It is clear that one unknown depends on the other unknown.

In a **linear** equation in two unknowns given in the form: $y = mx + d$

M = slope

It's the numerical measure of the steepness of a line.

It is a measure of how "steep" the solution line is with respect to the horizontal-axis (in this case, the x-axis)

So, how to find the slope of a linear equation if you don't know the equation?

To know the slope of a linear equation (or of a line on the Cartesian plane):!☑ you only need TWO points that are on the line (in other words, two pairs of solutions)

1. If $m > 0$, the line L slants upward from left to right
2. If $m < 0$, the line L slants downward from left to right
3. If $m = 0$, the line L is horizontal (parallel to the horizontal-axis)
4. If m is undefined, the line L is vertical (parallel to the vertical-axis)

Proportional: when one is the multiple of the other.

Constant of Proportional: when the fraction represents a rational number if an infinite, repeating decimal (0.2857)

Base: main number

Exponent (power): an exponent

Linear Equations: either one, no, or more solutions.

Consistent: If it has at least one solution.

Inconsistent: has no solution.

Fixed Numbers (constants) does not change.

Letter Symbols: (x,y,z) Either variables or unknowns.

1. Grouping Symbols (), [], & { }!

2. Exponents! ☒

3. Multiplication! ☒

4. Addition!

Area of a Rectangular = Length x width = L x W

The distributive property of multiplication with respect to addition states that for any numbers a, b and c:

$$\text{Ex) } a \times (b+c) = (a \times b) + (a \times c)$$

The distributive property of multiplication with respect to addition states that for any numbers a, b and c:

$$\text{EX) } a(b+c) = ab + ac$$

*Note 1: a is the common factor of both terms☒** Note 2: We say that we “**distribute**” when we rewrite

EX) $a(k+m)$ as $ak + am$.

The distributive property of multiplication with respect to addition states that for any numbers a , b , c , and d :

$$\text{EX) } (a+d) \times (b+c) = (a+d)(b+c) = ab + ac + db + dc$$

Linear Expression is a string of mathematical symbols involving (some but not necessarily all):

- 1) Operation Symbols: $+$, $-$, \times , $/$
- 2) Equals = or Inequalities Symbols: $<$, $>$.
- 3) Grouping Symbols: $()$, $\{$, $]$
- 4) Constants
- 5) Variables (or Unknowns) To the power of 0 or 1

Linear Equation:

- 1) Operation Symbols: $+$, $-$, \times , $/$
- 2) Equals = or Inequalities Symbols: $<$, $>$.
- 3) Grouping Symbols: $()$, $\{$, $]$
- 4) Constants:
- 5) Variables (or Unknowns) to the power of 0 or 1
- 6) Equals sign has to be there

To solve an equation means to find **all the values** of the unknowns that make the equality true.

$$\text{Expression 1} = \text{expression 2}$$

Combining like terms: terms that has the same letter-symbols (variable or unknown) or constant.

How many solutions have the following linear equations?

Say that **x** represents the horizontal axis, called the **x-axis!** and **y** represents the vertical axis, called the **y-axis.**

The **x-intercept:** the point where the line intercepts the x-axis.

The **y-intercept:** the point where the line intercepts the y-axis.

Note: Your unknowns will *not* always be **x** and **y**, so you will have to modify these names accordingly.

Theorem 1: Criterion For Parallel Lines!

Two **non-vertical lines** are parallel if and only if their **slopes are equal** and they have **different y-intercepts.**

Theorem 2: Criterion For Perpendicular Lines!

Two **non-vertical lines** are perpendicular if and only if the **product of their slopes is -1.**

A **System of Linear equations (SLE)** consists of a collection of two or more linear equations in two or more unknowns (the *same* unknowns in all equations).

To **solve the system:** Find **all** the values of the unknowns that satisfy **all** the equations in the system.

If the system of linear equations has **one or infinitely many solutions**, it is called **consistent.!**

If the system of linear equations has **no solution**, it is called **inconsistent.!**