

Middle School Math Terminology

Table of Contents

Mathematical Operations & Key Words...	page 1
Computation.....	page 2
Number Properties.....	page 3
Expressing Numbers.....	page 5
Fractions.....	page 7
Percent Applications.....	page 9
Integers.....	page 10
Exponents.....	page 12
Algebra Terms.....	page 13
Angles.....	page 15
Line and Angle Relationships.....	page 16
Geometric Relationships.....	page 18
Polygons.....	page 20
Triangles.....	page 21
Quadrilaterals.....	page 22
Solids.....	page 23
Coordinate Graphs.....	page 24
Perimeter, Area, Volume.....	page 26
Special Circle Terms.....	page 28
Pythagorean Theorem.....	page 29
Data Analysis.....	page 30
Types of Charts and Graphs.....	page 31
Probabilities.....	page 34

Middle School Math Terminology

Conversion Time.....	page 36
Conversion Distance.....	page 37
Conversion Volume.....	page 38
Conversion Mass.....	page 39
Roman Numerals.....	page 40

Middle School Math Terminology

Mathematical Operations and Key Words

Addition: add to, all together, both, combined, in all, increase by, more than, perimeter, plus, sum, total, gain of, additional, together

Subtraction: decreased by, difference, fewer than, how many more, left, less, less than, minus, remaining, take away, change, taken from, have left, loss of, words ending in –er (longer, higher, faster, slower, farther, etc.)

Multiplication: area, multiplied by, of, product of, rate, times, double (2 times), twice (2 times), triple (3 times), factor of, at this rate

Division: divided, half (divide by 2), third (divide by 3), how many, each, out of, per, percent, quotient, goes into, evenly, each, equally, separate

Equals: is, are, was, were, will be, gives, yields

Middle School Math Terminology

Computation

Addend: numbers that are being added

Sum: the answer to an addition problem

Difference: the answer to a subtraction problem

Factor: numbers that are being multiplied

Multiple: a number that can be divided by another number without a remainder

Product: the answer to a multiplication problem

Quotient: the answer to a division problem

Order of Operations ALWAYS work left to right:
Parentheses, Exponents, Multiplication and
Division, Addition and Subtraction

Middle School Math Terminology

Number Properties

Identity property of 0: adding zero to a number does not change the number

$$x + 0 = x$$

Identity property of 1: multiplying 1 by a number does not change the number

$$x * 1 = x$$

Commutative property of addition: changing the order of addends does not change the sum

$$x + y = y + x$$

Commutative property of multiplication: changing the order of factors does not change the product

$$x * y = y * x$$

Middle School Math Terminology

Associative property of addition: changing the grouping of addends does not change the sum; grouping is shown with parentheses

$$x + (y + z) = (x + y) + z$$

Associative property of multiplication: changing the grouping of factors does not change the product; grouping is shown with parentheses

$$x * (y * z) = (x * y) * z$$

Distributive Property: the product of a number and a sum equals the sum of the individual products of the addends and that number

$$x * (y + z) = (x * y) + (x * z)$$

Middle School Math Terminology

Expressing Numbers

Whole number place values (read from the decimal to the left) ones, tens, hundreds, thousands, ten thousands, hundred thousands, millions, ten millions, hundred millions, billions

Decimal place values (read from the decimal to the right) tenths, hundredths, thousandths, ten-thousandths, hundred-thousandths

Standard form of a number: a number as it is usually written

Expanded form of a number: a number that is expressed as the sum of multiples of ten; example $643 = 600 + 40 + 3 = (6 \times 100) + (4 \times 10) + (3 \times 1)$

Scientific Notation: a standardized way of writing very large or very small numbers; example 3.51×10^{13}

Middle School Math Terminology

Prime number: a number that has only two factors, 1 and itself

Composite number: a number that has more than two factors

Natural or Whole number: the counting numbers (1, 2, 3, etc.)

Rational number: a number that can be expressed as a fraction, including integers

Ordinal number: a number used to tell order (1st, 2nd, 3rd, etc.)

Middle School Math Terminology

Fractions

Fraction: relationship of a part to a whole

Numerator: represents the part

Denominator: represents the whole

Fractions with a denominator of 1 are equivalent to the numerator

Fractions with a numerator of 1 cannot be simplified

Fractions with a numerator of 0 equals 0

Fractions with a denominator of 0 are undefined because there is no such thing as “part of nothing”

Adding or subtracting fractions requires the denominators be the same

Before you multiply or divide mixed numbers, rewrite them as improper fractions

Middle School Math Terminology

Multiplying fractions: multiply the numerators for your new numerator, multiply the denominators for your new denominator, then simplify the product

Dividing fractions: rewrite the first fraction, write a multiplication sign, write the reciprocal of the second fraction, multiply the fractions

Ratio: comparison of two quantities, can be written as a fraction, with the word “to”, or with “:” between the numbers

Proportion: relationship between two equivalent ratios

Rate of change: ratio that represents amount of something per time unit; can be positive and negative

Note: Distance = rate times time

Middle School Math Terminology

Percent Applications

Calculate percent of a number: change the percent to a decimal (divide by 100) then multiply by that number

Sales Tax = percent tax times original price

Sale Price = original price minus discount

Discount = regular price times rate of discount

Calculate percent increase or decrease: divide the difference by the starting amount and then multiply by 100

Interest = principal times rate times time (in years)

Total Amount earned = principal + interest

Middle School Math Terminology

Integers

Integers: all positive and negative whole numbers

Negative integers are to the left of zero, smaller negative integers are further from zero

Positive integers are to the right of zero, larger positive integers are further from zero

Absolute value: the distance of an integer from 0

Addition with integers

if sign is the SAME – add absolute values and keep the sign

if the sign is DIFFERENT – subtract absolute values and keep the sign of the larger absolute value

Middle School Math Terminology

Subtraction with integers

change the subtraction sign to addition AND the sign of the second number

follow the guidelines for addition

Multiplication and Division with integers: count the number of negative integers

if there are an even number of negative integers, the product or quotient will be positive

if there are an odd number of negative integers, the product or quotient will be negative

Middle School Math Terminology

Exponents

Exponential Notation: a number written with a base and exponent

Base: the number that is multiplied by itself

Exponent: the number that tells you how many times to multiply the base

Square Root: a number that must be multiplied by itself to equal a given number

$$a^n = \underbrace{aaaa\dots a}_{(n \text{ times})}$$

$$a^0 = 1$$

$$a^{-n} = 1/a^n$$

$$a^{1/2} = \sqrt{a}$$

$$a^x a^y = a^{x+y}$$

$$a^x / a^y = a^{x-y}$$

$$(a^x)^y = a^{xy}$$

$$(ab)^x = a^x b^x$$

$$(a/b)^x = a^x / b^x$$

Middle School Math Terminology

Algebra Terms

Expression: a phrase made up of one or more numbers, variables, and operations

Equation: equivalent expressions

Function: relationship between two variables, can have only one x-value correspond to only one y-value

Sequence: a list of numbers in a special order

Algorithm: step-by-step procedure for solving a problem

Variable can be:

a letter that can be replaced with any number from a set

a quantity that varies or changes according to certain circumstances

a placeholder for any value

Middle School Math Terminology

Coefficient: the number that is multiplied by variable(s)

Inverse Operations: operations that undo each other (addition and subtraction are inverse operations; multiplication and division are inverse operations)

1-Step Equations: identify inverse operation to isolate variable

2-Step Equations: first add/subtract, then multiply/divide to isolate variable

Middle School Math Terminology

Angles

right angle: an angle that is exactly 90 degrees
(90°)

acute angle: an angle less than 90 degrees
(90°)

obtuse angle: an angle more than 90 degrees
(90°)

supplementary angles: two angles that add up
to 180°

complementary angles: two angles that add up
to 90°

the sum of the 3 angles of a triangle is 180°

the sum of the 4 angles of a quadrilateral is
360°

a straight line is 180°

Middle School Math Terminology

Line and Angle Relationships

parallel: lines that will never intersect

perpendicular: lines that intersect at exactly 90°

transversal: a line that cuts across a pair of parallel lines

alternate angles: angles on opposite sides of a transversal, they are always congruent

adjacent angles: side by side, have a common vertex and a common ray, if they are along a straight line, they add up to 180°

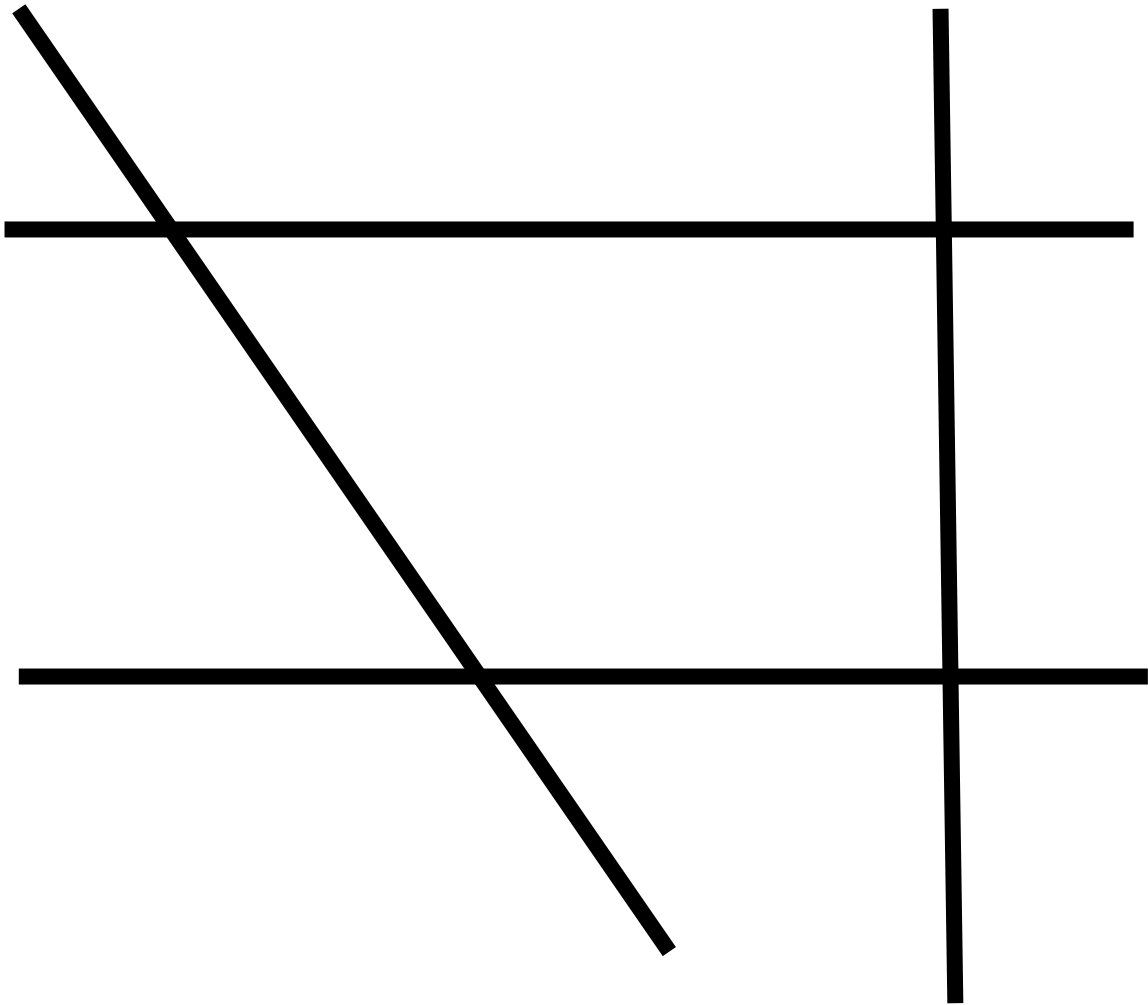
interior angles: angles that are inside the parallel lines

exterior angles: angles that are outside the parallel lines

vertical angles: opposite one another at the intersection of two lines, they are always congruent

Middle School Math Terminology

corresponding angles: angles that are in the same position in congruent or similar figures



Middle School Math Terminology

Geometric Relationships

attribute: characteristics of a figure (size, shape, color, etc.)

congruent figures: have the same size and shape

similar figures: have the same shape, but are different sizes

transformation: a rotation (turn) or translation (slide) or reflection (flip) of a geometric figure

rotation: turn around a fixed point

full turn = 360°

$1/2$ turn = 180°

$1/3$ turn = 120°

$1/4$ turn = 90°

$1/6$ turn = 60°

$1/8$ turn = 45°

Middle School Math Terminology

translation: slide along a straight line

reflection: flip over a line

magnification: increase or decrease in size

Middle School Math Terminology

Polygons

polygon: a closed figure formed by 3 or more lines

3-sided polygon: triangle

4-sided polygon: quadrilateral

5-sided polygon: pentagon

6-sided polygon: hexagon

7-sided polygon: heptagon

8-sided polygon: octagon

9-sided polygon: nonagon

10-sided polygon: decagon

Middle School Math Terminology

Triangles

equilateral triangle: a triangle whose 3 sides are the same length and whose 3 angles are the same measure (60°)

isosceles triangle: a triangle with 2 sides the same length and 2 angles the same measure

scalene triangle: a triangle with no sides the same length and no angles the same measure

acute triangle: a triangle whose angles are less than 90 degrees (90°)

right triangle: a triangle with an angle that is exactly 90 degrees (90°)

obtuse triangle: a triangle with one angle that is more 90 degrees (90°)

Middle School Math Terminology

Quadrilaterals

quadrilateral: a figure with 4 sides

rectangle: a quadrilateral with 4 right angles and 2 pairs of parallel sides, opposite sides are the same length

square: a rectangle whose 4 sides are the same length

parallelogram: a quadrilateral with 2 pairs of parallel sides, opposite sides are the same length, two opposite angles are acute and two opposite angles are obtuse

rhombus: a parallelogram whose 4 sides are the same length

kite: a quadrilateral whose adjacent (side by side, sharing an angle) sides are the same length

trapezoid: a quadrilateral with exactly 1 pair of parallel sides

Middle School Math Terminology

Solids

solid: a 3-dimensional figure (length, width, height)

pyramid: polygon for a base and triangular sides; pyramids are named by their polygon bases

prism: 2 parallel polygons for bases and rectangular sides; prisms are named by their polygon bases

cube: a special rectangular prism made of square bases and sides

cone: circular base and a curved surface and one vertex (point) (when the curved surface is spread out flat, it is similar to a triangle)

cylinder: 2 parallel circular bases and a curved surface (when the curved surface is spread out flat, it is in the shape of a rectangle)

Middle School Math Terminology

Coordinate Graphs

coordinate plane: formed by a horizontal line (x-axis) that intersects a vertical line (y-axis)

quadrant I: positive x and positive y values

quadrant II: negative x and positive y values

quadrant III: negative x and negative y values

quadrant IV: positive x and negative y values

coordinates (x, y): the numbers in an ordered pair that describe the location of a point in the coordinate plane; remember to move left or right for the x-value, then move up or down for the y-value

origin: the point where the x-axis and y-axis intersect (0, 0)

intercept: a place where lines cross

Middle School Math Terminology

y-intercept: the point where the line crosses the y-axis $(x, 0)$

x-intercept: the point where the line crosses the x-axis $(0, y)$

slope of a line: change in y value related to change in x value

equation of a straight line: $y = mx + b$

m is the slope of the line (change in y over change in x)

b is the y-intercept

Middle School Math Terminology

Perimeter, Area, Volume

perimeter: sum of the length of the sides

area: the number of square units inside a polygon

formulas for area:

$$A (\text{triangle}) = \frac{1}{2} bh$$

$$A (\text{rectangle}) = lw$$

$$A (\text{square}) = s^2$$

$$A (\text{parallelogram}) = bh$$

$$A (\text{trapezoid}) = \frac{1}{2} h(b_1+b_2)$$

surface area: the total area of all the sides of a 3-D shape

$$\begin{aligned} \text{surface area of rectangular prism} &= \\ 2lw+2lh+2wh &= 2(lw+lh+wh) \end{aligned}$$

$$\text{surface area of cube} = 6s^2$$

Middle School Math Terminology

surface area of cylinder = $2\pi rh + 2\pi r^2$

volume: amount of space enclosed in a solid

formulas for volume:

volume of a cylinder = $\pi r^2 h$

volume of rectangular prism = lwh

volume of prism (general) = Bh

volume of pyramid (general) = $\frac{1}{3} Bh$

volume of cone = $\frac{1}{3} Bh$

l = length

w = height

b = length of base

s = length of side

h = height

r = radius

B = area of base

π = pi = 3.14

Middle School Math Terminology

Special Circle Terms

radius: distance from the center of a circle to its edge ($r = \frac{1}{2} d$)

diameter: distance from one side of a circle, through the center, to the other side ($d = 2r$)

circumference: perimeter of a circle; $C = 2\pi r = \pi d$

area of a circle = πr^2

Pythagorean Theorem

For Right-Angled Triangles

Hypotenuse: the side of a right-angled triangle that is opposite the right angle

Legs: the sides of a right-angled triangle adjacent to the right angle, they are shorter than the hypotenuse

Pythagorean Theorem: a and b are legs, c is hypotenuse

$$c^2 = a^2 + b^2$$

Middle School Math Terminology

Data Analysis

Mean: add the numbers in a set, then divide by the number of numbers in the set

Median: middle number in a set listed from least to greatest

Mode: most frequently occurring number(s) in a set

Range: difference between greatest and least numbers in a set

Middle School Math Terminology

Types of Charts and Graphs

number line: a line with numbers placed in their correct positions, 0 is in the middle, negative numbers are to the left of 0 and positive numbers are to the right of 0

inequality graphing hints

solid dot means equal to

hollow dot is not equal to

lines to the left mean less than

lines to the right mean greater than

READ CAREFULLY the lines between two dots

circle graph: shaped like a circle and divided into pieces that look like pieces of a pie; the pieces are usually labeled as percents and they must add up to 100%; best used to compare parts of a whole event

Middle School Math Terminology

bar graph: bars represent different categories of data; best used to compare values across categories

picture graph: uses pictures or symbols to show data; similar to a bar graph, it is best used to compare categories of data

line graph: displays the relationship between two types of information; best used to show trends over time

scatter plot: show individual data points; used to find the relationship or correlation; positive correlations show an increasing set of data points; negative correlations show a decreasing set of data points

frequency chart: a table that lists items and how many times each item occur; best used to show the number of times something occurs within a range

Middle School Math Terminology

histogram: bars that display the frequency of data; best used when you want to display information from a frequency chart

Venn diagram: shown with two overlapping circles; the overlapping part usually contains information that relates to both sides of the diagram

stem-and-leaf plot: compares and organizes data into intervals, usually you separate your number into the stem (digit to the far left) and leaf (the rest of the digits)

box-and-whisker plot: plots the ranges of data sets; the box shows the mean, median and mode; the whiskers show the largest and smallest numbers

Middle School Math Terminology

Probabilities

Probability: a number between 0 (impossible) and 1 (certain) that describes how likely an outcome is to occur

Sample Space: list of individual outcomes that are possible

Independent events: events that do not influence one another; each event occurs without changing the probability of the other event

Dependent events: events that influence; if one event occurs, it changes the probability of the other event

Counting Principle: when there are M ways to do one thing and N ways to do another, then there are M times N ways of doing both (I have 3 shirts and 4 pants, I have 3 times 4 = 12 outfits)

Middle School Math Terminology

Factorial: multiply a series of descending numbers; product of an integer and all smaller positive integers

Combination: a selection of objects from a set, the order of the objects doesn't matter (r objects from a set of n objects); making a fruit salad with apples, grapes and bananas the order doesn't matter

$$C = n!/r!(n-r)!$$

Permutation: a selection of objects from a set, the order of objects DOES matter (k objects from a set of n objects); dialing a phone number 4-7-2, the order does matter;

$$P = n!/(n-k)!$$

Fibonacci sequence: the sequence of numbers where each number, except the first two is the sum of the two preceding numbers

1, 1, 2, 3, 5, 8, 13, 21

Middle School Math Terminology

Conversion Time

1 minute (min) = 60 seconds (sec)

1 hour (hr) = 60 minutes

1 day = 24 hours

1 week (wk) = 7 days

1 year (yr) = 12 months (mo) or 52 weeks

1 year = 365 days

1 leap year = 366 days

Middle School Math Terminology

Conversion Distance

1 foot (ft) = 12 inches (in.)

1 yard (yd) = 36 inches

1 yard = 3 feet

1 mile (mi) = 5,280 feet

1 mile = 1,760 yards

1 nautical mile = 6,076.115 feet

1 millimeter (mm) = 0.001 meter (m)

1 centimeter (cm) = 0.01 meter

1 decimeter (dm) = 0.1 meter

1 kilometer (km) = 1,000 meters

Middle School Math Terminology

Conversion Volume

1 teaspoon (tsp) = $\frac{1}{6}$ fluid ounce (fl oz)

1 tablespoon (tbsp) = $\frac{1}{2}$ fluid ounce

1 cup (c) = 8 fluid ounces

1 pint (pt) = 2 cups

1 quart (qt) = 2 pints

1 quart = 4 cups

1 gallon (gal) = 4 quarts

1 milliliter (mL) = 0.001 liter (L)

1 centiliter (cL) = 0.01 liter

1 deciliter (dL) = 0.1 liter

1 kiloliter (kL) = 1,000 liters

Middle School Math Terminology

Conversion Mass

1 pound (lb) = 16 ounces (oz)

1 ton (T) = 2,000 pounds

1 milligram (mg) = 0.001 gram (g)

1 centigram (cg) = 0.01 gram

1 decigram (dg) = 0.1 gram

1 kilogram (kg) = 1,000 grams

1 metric ton (t) = 1,000 kilograms

Middle School Math Terminology

Roman Numerals

1 = I

2 = II

3 = III

4 = IV

5 = V

6 = VI

7 = VII

8 = VIII

9 = IX

10 = X

50 = L

100 = C

500 = D

1000 = M