Middle School Mathematics Vocabulary Word Wall Cards

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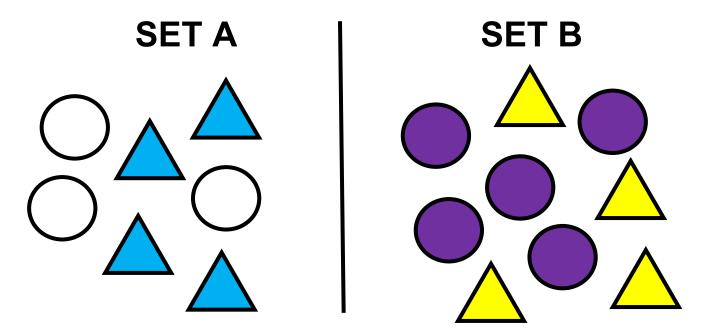
Multistep Equations

Multistep Equations

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Ratio

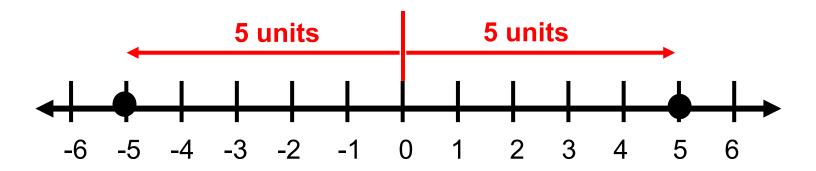
a comparison of any two quantities



▲ to ○	4 to 3
▲ to all of set A	4 7
O to	3:5
set B to set A	9 to 7 or 9:7

Absolute Value

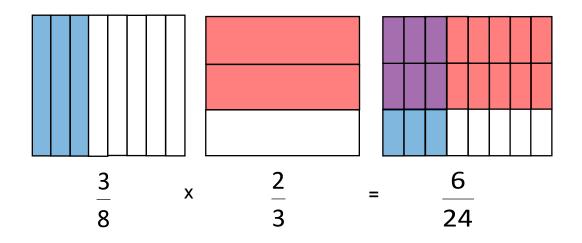
$$|5| = 5$$
 $|-5| = 5$



distance a number is from zero

Fraction Multiplication

How much is $\frac{3}{8}$ of $\frac{2}{3}$?

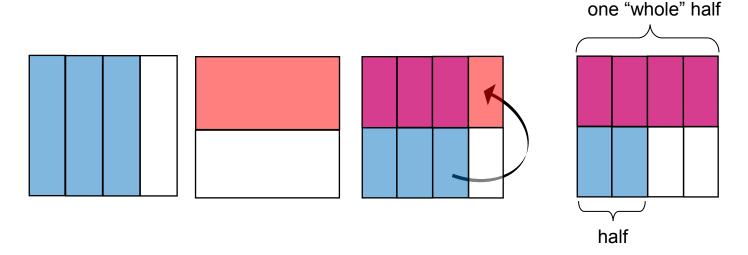


$$\frac{3}{8} \times \frac{2}{3} = \frac{6}{24} = \frac{1}{4}$$

Fraction Division

$$\frac{3}{4} \div \frac{1}{2}$$

How many halves are in three-fourths?



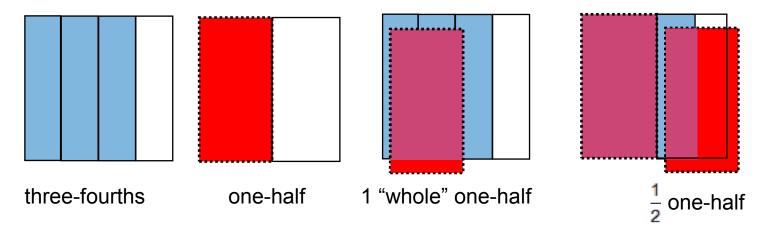
There are $1\frac{1}{2}$ halves in three-fourths.

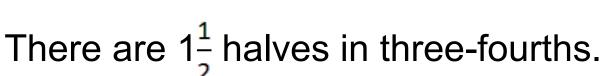
$$\frac{3}{4} \div \frac{1}{2} = 1\frac{1}{2}$$

Fraction Division

$$\frac{3}{4} \div \frac{1}{2}$$

How many halves are in three-fourths?





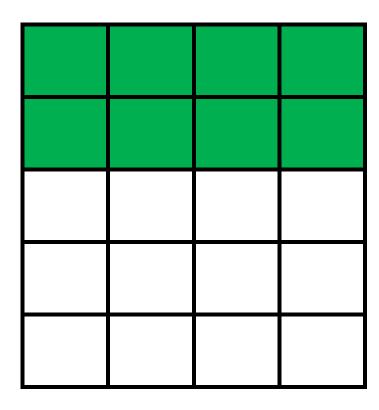
$$\frac{3}{4} \div \frac{1}{2} = 1\frac{1}{2}$$

Percent

Per hundred

$$56\% = \frac{56}{100} = \frac{14}{25} = 0.56$$

Equivalent Relationships

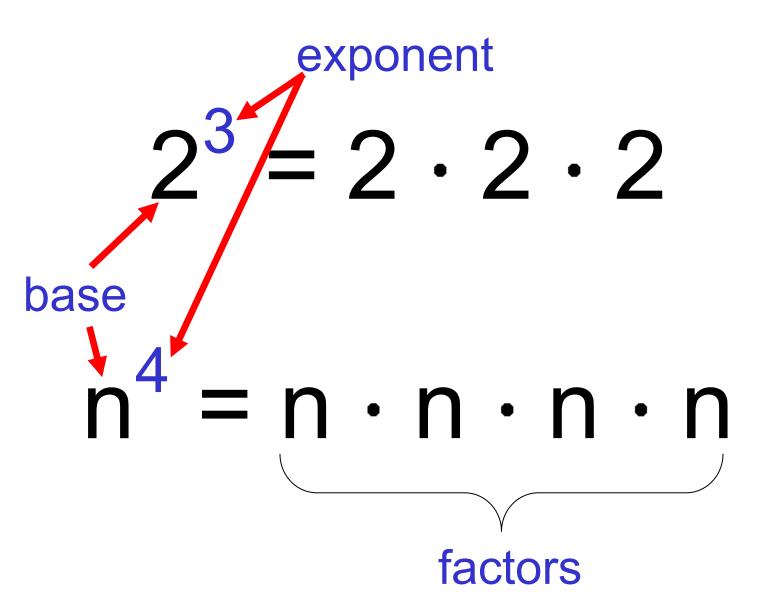


Fraction: $\frac{2}{5}$

Decimal: 0.4

Percent: 40%

Exponential Form



Perfect Squares

$$0^{2} = 0 \cdot 0 = 0$$
 $1^{2} = 1 \cdot 1 = 1$
 $2^{2} = 2 \cdot 2 = 4$
 $3^{2} = 3 \cdot 3 = 9$
 $4^{2} = 4 \cdot 4 = 16$
 $5^{2} = 5 \cdot 5 = 25$

$$\sqrt{16} = \sqrt{4 \cdot 4} = 4$$
perfect square

Powers of Ten

	Meaning	Value
10 ⁴	10 · 10 · 10 · 10	10,000
10 ³	10.10.10	1000
10 ²	10.10	100
10 ¹	10	10
10 ⁰	1	1
10 ⁻¹	1 10	0.1
10 ⁻²	$\frac{1}{10} \cdot \frac{1}{10}$	$\frac{1}{100} = 0.01$
10 ⁻³	$\frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10}$	$\frac{1}{1000} = 0.001$
10 ⁻⁴	$\frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10}$	$\frac{1}{10,000} = 0.0001$

Scientific Notation

 $a \times 10^{n}$

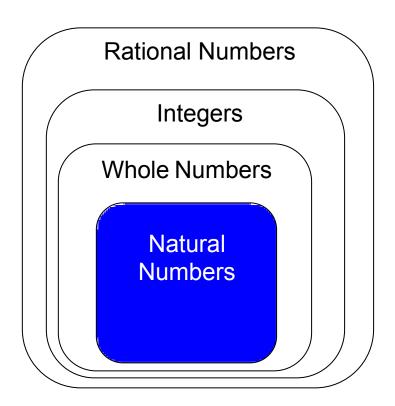
a = number greater than orequal to 1 and less than 10n = integer

 $17,500,000 = 1.75 \times 10^7$

 $0.0000026 = 2.6 \times 10^{-6}$

Natural Numbers

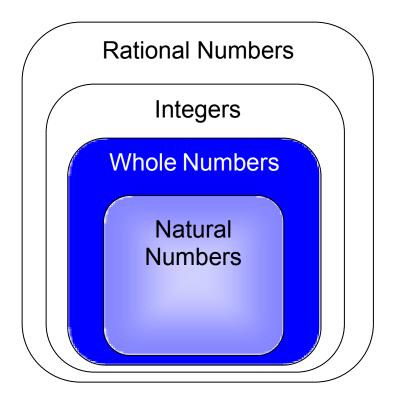
The set of numbers 1, 2, 3, 4...



Irrational Numbers

Whole Numbers

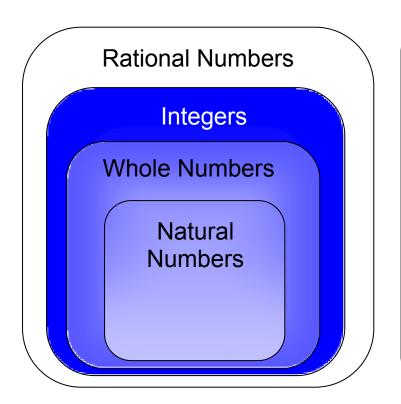
The set of numbers 0, 1, 2, 3, 4...



Irrational Numbers

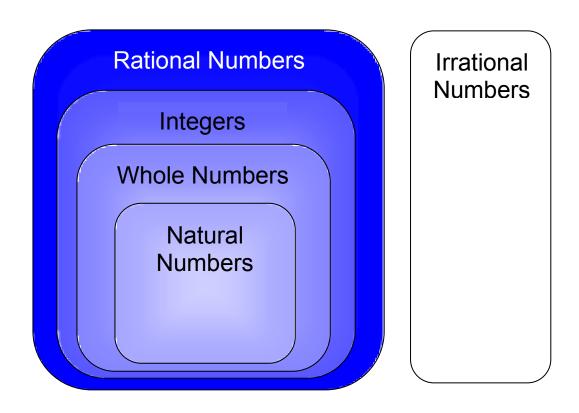
Integers

The set of numbers ...-3, -2, -1, 0, 1, 2, 3...



Irrational Numbers

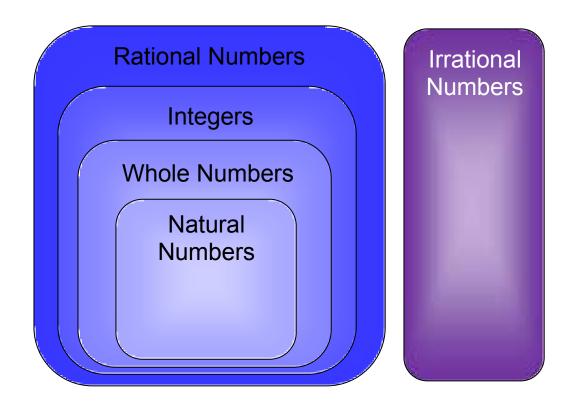
Rational Numbers



A number that can be written as the quotient of two integers

$$2\frac{3}{5}$$
 -5 0.3 $\sqrt{16}$ $\frac{13}{7}$

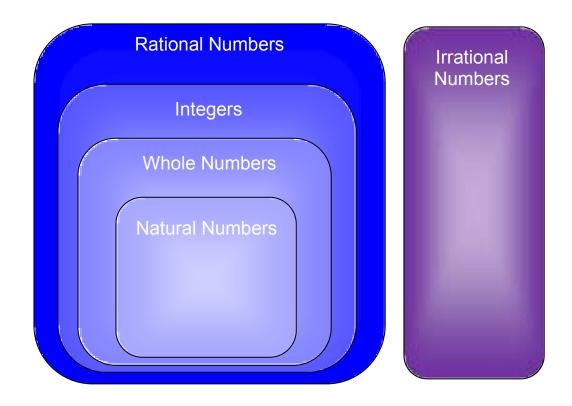
Irrational Numbers



A number that cannot be expressed as the quotient of two integers

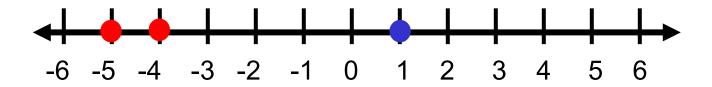
 $\sqrt{7}$ π -0.2322322232223...

Real Numbers



The set of all rational and irrational numbers

Comparing Integers

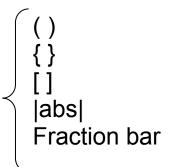


$$-5 < 1 \text{ or } 1 > -5$$

$$-4 > -5$$
 or $-5 < -4$

Order of Operations

Grouping Symbols [1] [abs] Fraction bar



Exponents

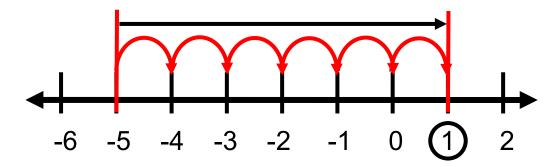
Multiplication Division

Addition Subtraction

Integer Operations

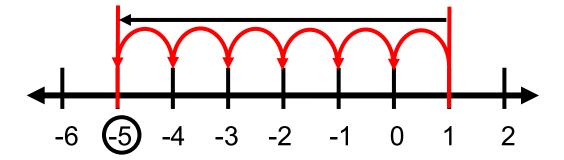
Addition

$$-5 + 6 = 1$$



Subtraction

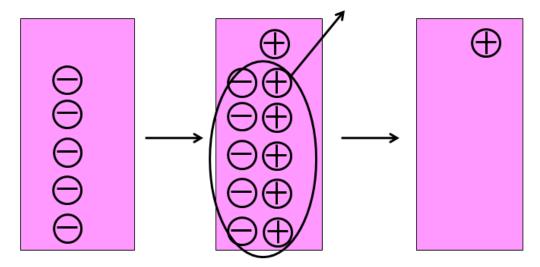
$$1 - 6 = -5$$



Integer Operations

Addition

$$-5 + 6 = 1$$



Subtraction

$$1-6=-5$$

$$\oplus$$

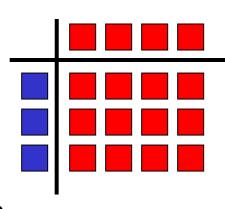
$$00000$$

$$00000$$

Integer Operations

Multiplication

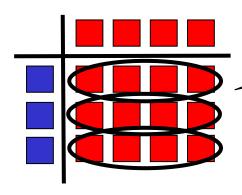
$$3 \cdot (-4) = -12$$



How many tiles are in 3 groups of -4 tiles?

Division

$$-12 \div -4 = 3$$



How many groups of -4 tiles are in -12 tiles?

Proportion

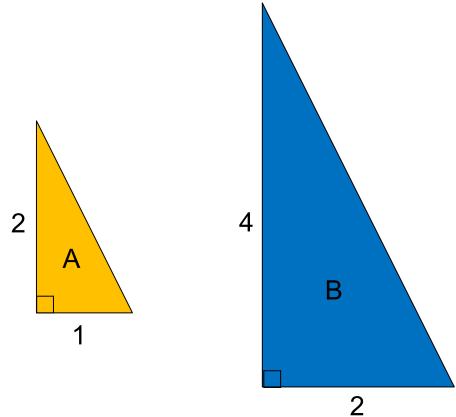
$$\frac{a}{b} = \frac{c}{d}$$

$$a:b = c:d$$

a is to b as c is to d

Scale Factor

Figures A and B are similar.



What is the scale factor from A to B? Scale factor = 2

What is the scale factor from B to A?

Scale factor =
$$\frac{1}{2}$$

Unit Rate

\$4 per gallon =
$$\frac{$4}{1 \text{ gallon}}$$

70 miles per hour =
$$\frac{70 \text{ miles}}{1 \text{ hour}}$$

Percent of Increase

Percent of change = <u>new – original</u> original



Was \$3.25 per gallon

Now \$3.85 per gallon

What is the percent of increase?

$$\frac{3.85 - 3.25}{3.25}$$

$$\frac{0.60}{3.25} = 0.18$$

increase of 18%

Percent of Decrease

Percent of change = <u>new – original</u> original



Was \$1200 Now only \$900 What is the percent of decrease?

$$\frac{-300}{1200} = -0.25$$

decrease of 25%

Square Root

radical symbol

$$\sqrt{36} = 6$$

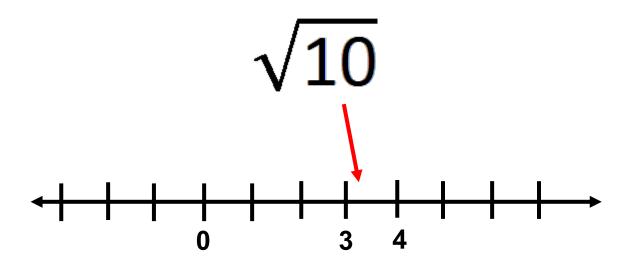
$$\sqrt{36} = \sqrt{6.6} = \sqrt{6^2} = 6$$

Squaring a number and taking a square root are inverse operations.

$$-\sqrt{36} = -6$$

 $(-6)^2 = -6 \cdot -6 = 36$

Square Root



between $\sqrt{9}$ and $\sqrt{16}$

Ballpark Comparisons Length

1 inch or2.5 centimeter



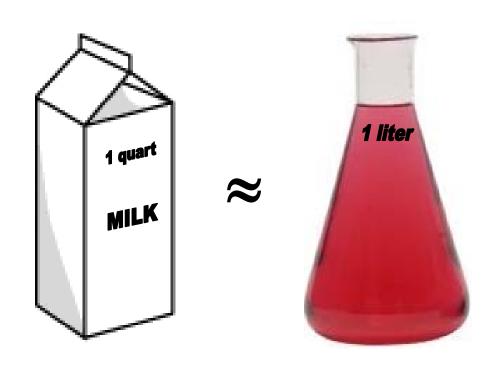


1 yard < 1 meter

Ballpark Comparisons Weight/Mass



Ballpark Comparisons Volume

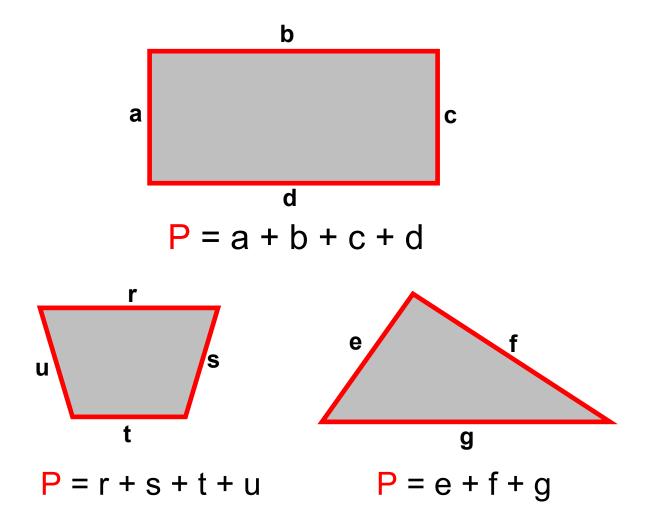


Ballpark Comparisons Temperature

	Fahrenheit	Celsius
Water freezes	32°F	0°C
Water boils	212°F	100°C
Body Temperature	98°F	37°C
Room Temperature	70°F	20°C

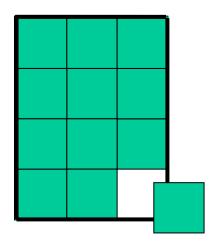
Perimeter

the measure of the distance around a figure



Area

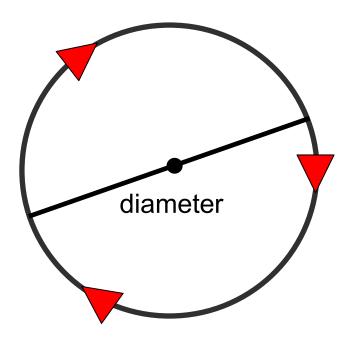
the number of square units needed to cover a surface or figure



Area = 12 Square Units

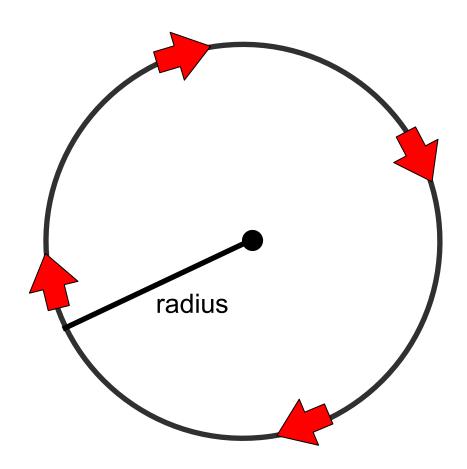
Pi

 $\pi \approx 3.14159...$



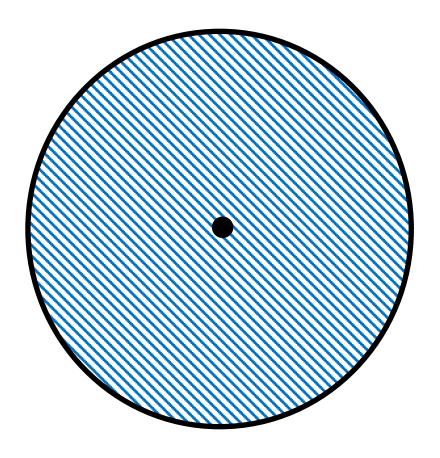
$$\pi = \frac{\text{circumference}}{\text{diameter}}$$

Circumference



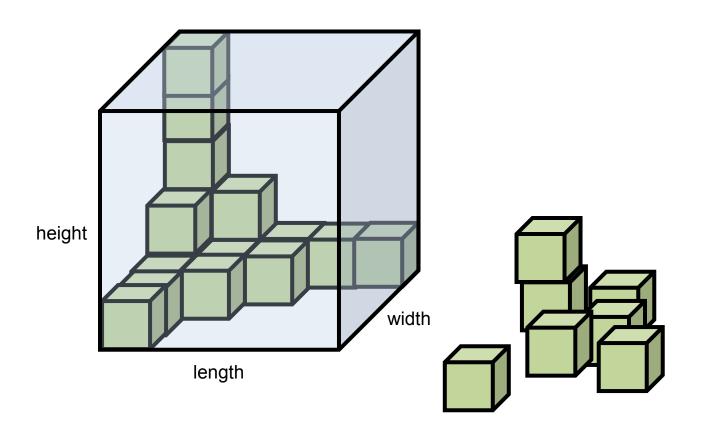
 $C = 2\pi r$ C = perimeter of a circle

Area of a Circle



$$A = \pi r^2$$

Volume of a Prism

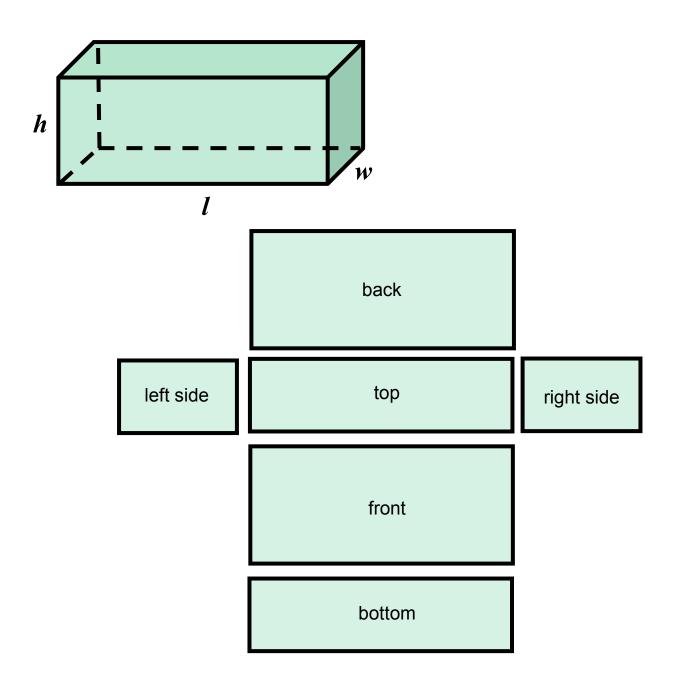


Volume = length x width x height

V = Iwh

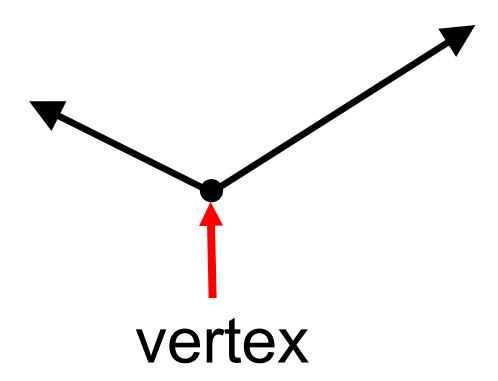
measured in cubic units

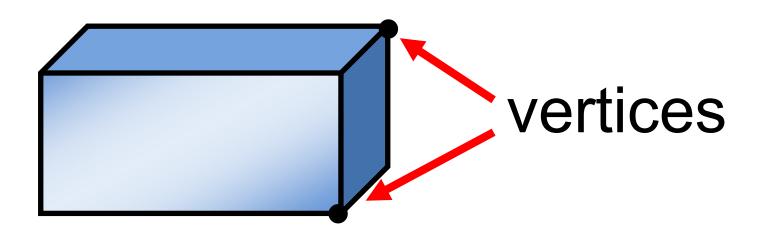
Surface Area



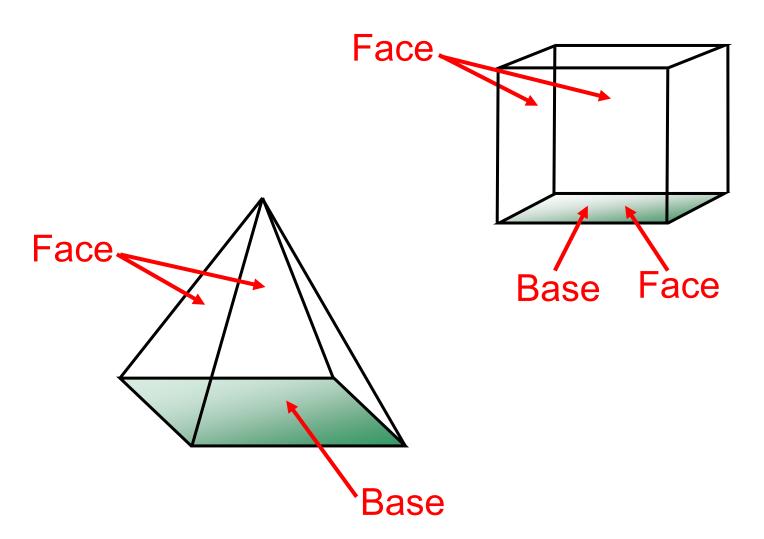
Surface Area (S.A.) = sum of areas of faces

Vertex

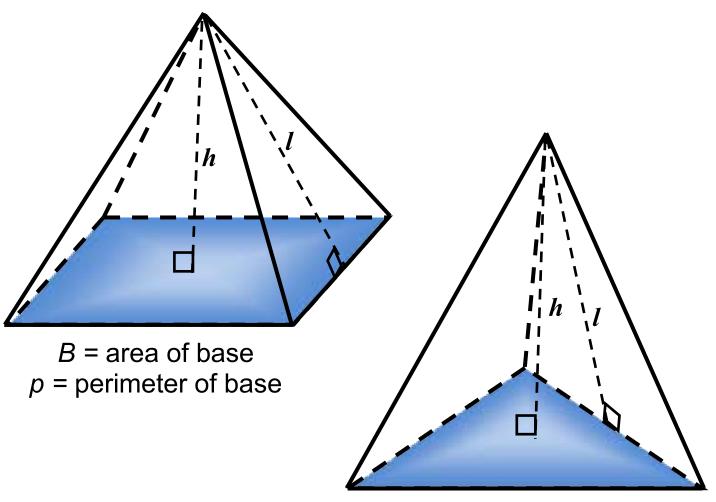




Face and Base



Pyramid

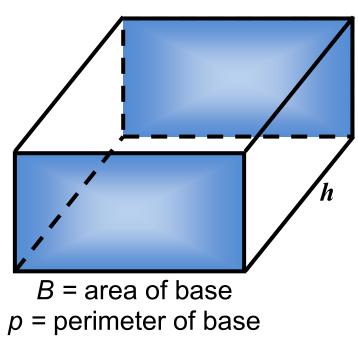


$$V = \frac{1}{3}Bh$$

B = area of base p = perimeter of base

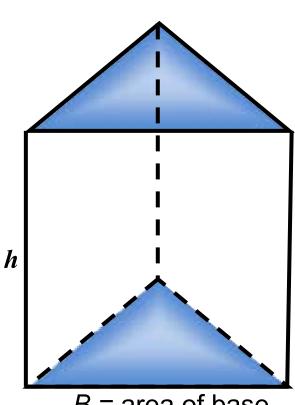
$$S.A. = \frac{1}{2}lp + B$$

Prism



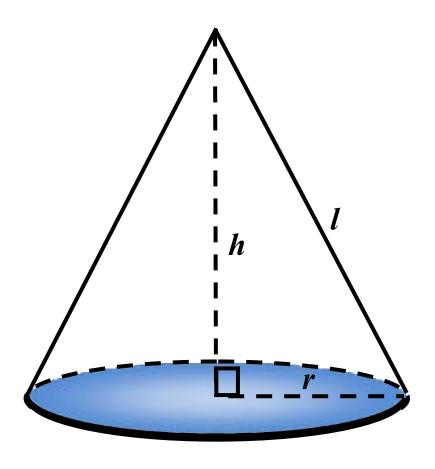
$$V = Bh$$

$$S.A. = hp + 2B$$



B = area of basep = perimeter of base

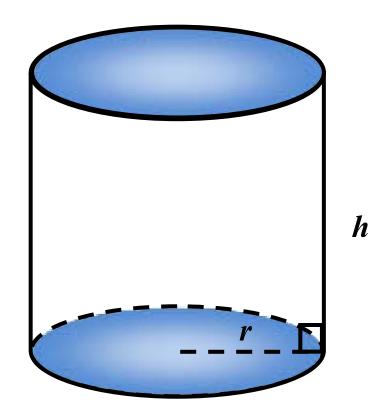
Cone



$$V = \frac{1}{3}\pi r^2 h$$

$$S.A. = \pi r^2 + \pi r I$$

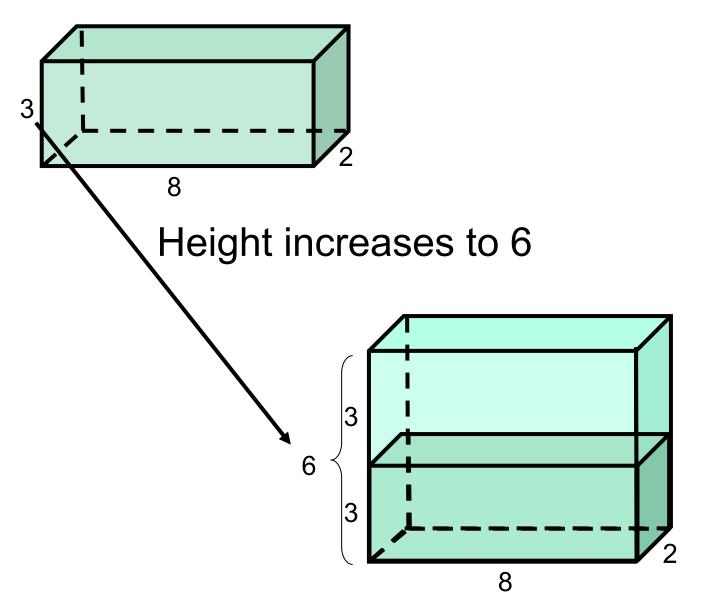
Cylinder



$$V = \pi r^2 h$$

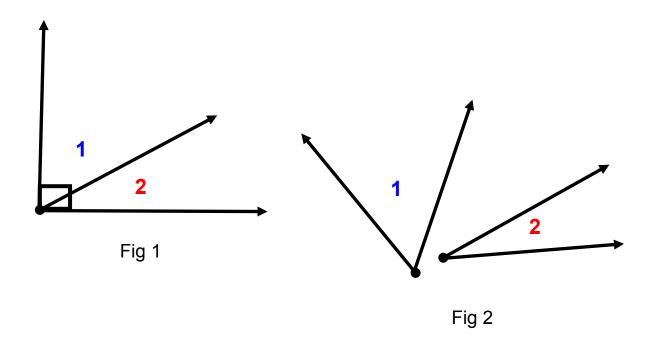
$$S.A. = 2\pi r^2 + 2\pi rh$$

Volume Changing one attribute



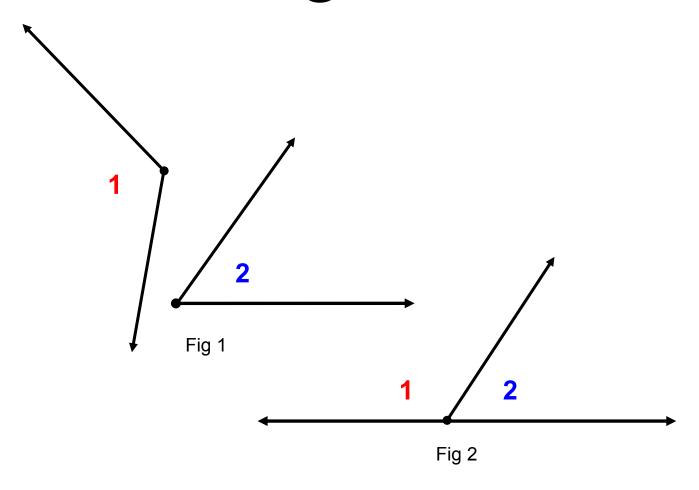
What happens to the volume?

Complementary Angles



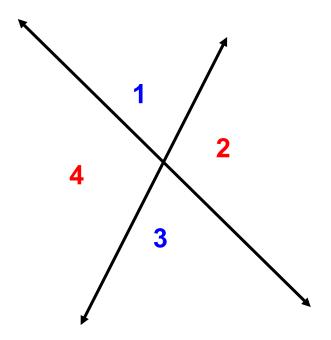
 $m\angle 1 + m\angle 2 = 90^{\circ}$ in each figure

Supplementary Angles



$$m\angle 1 + m\angle 2 = 180^{\circ}$$
 in each figure

Vertical Angles

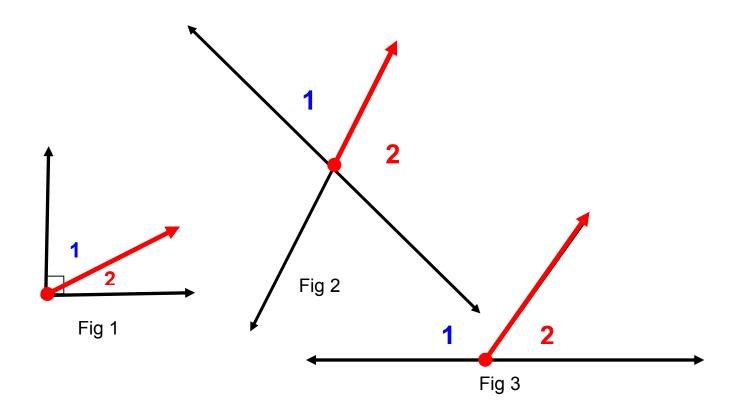


∠1 and ∠3 are vertical angles.
∠2 and ∠4 are vertical angles.

 $\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$

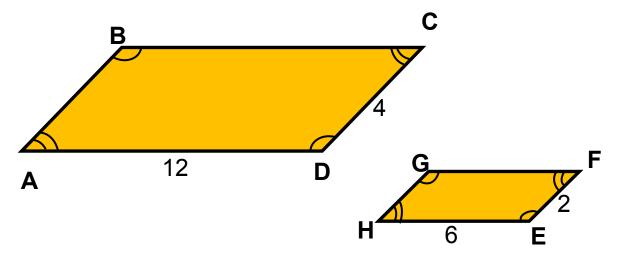
Adjacent Angles

∠1 is adjacent to ∠2 in each figure



Share a common side and a common vertex

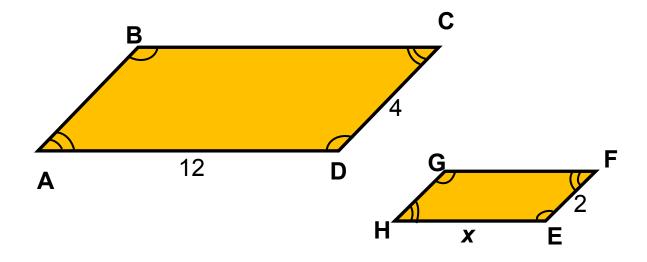
Similar Figures



ABCD ~ HGFE		
Angles	Sides	
∠A corresponds to ∠H	\overline{AB} corresponds to \overline{HG}	
∠B corresponds to ∠G	\overline{BC} corresponds to \overline{GF}	
∠C corresponds to ∠F	CD corresponds to FE	
∠D corresponds to ∠E	DA corresponds to EH	

Corresponding angles are congruent. Corresponding sides are proportional.

Similar Figures and Proportions



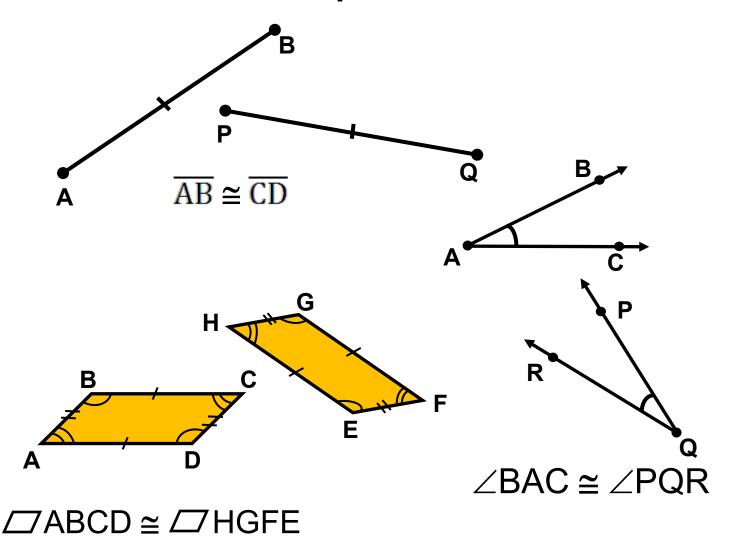
ABCD ~ HGFE

$$\frac{DC}{EF} = \frac{AD}{HE}$$

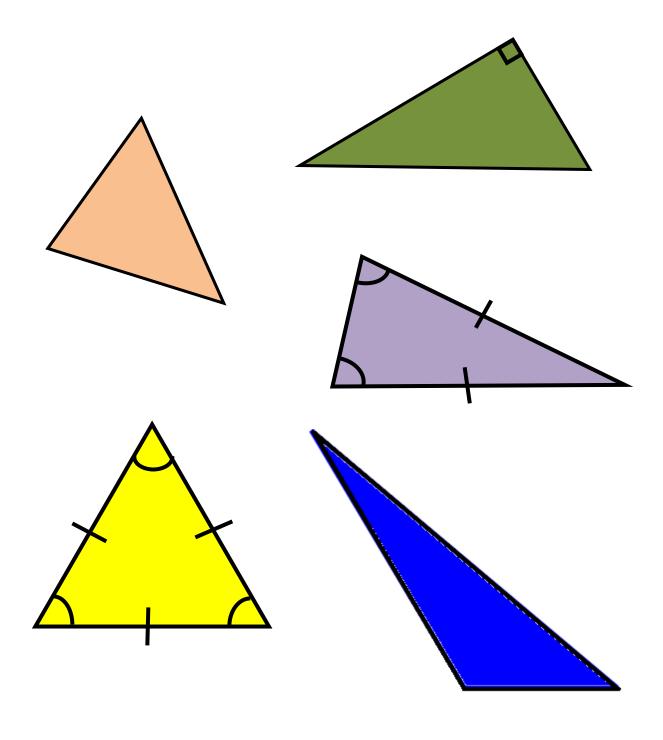
$$\frac{4}{2} = \frac{12}{x}$$

Congruent Figures

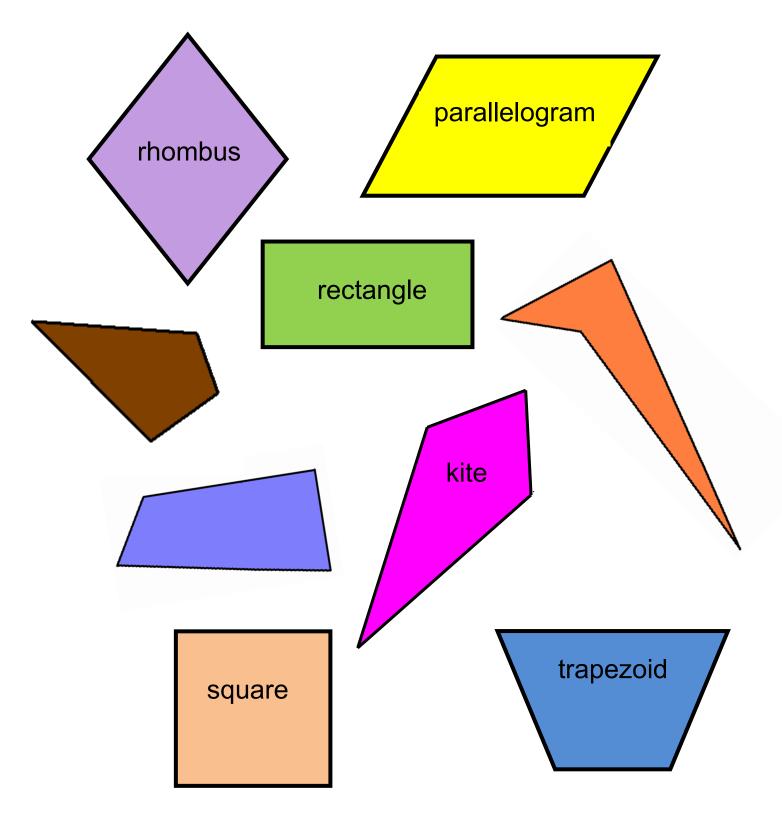
have exactly the same shape and size



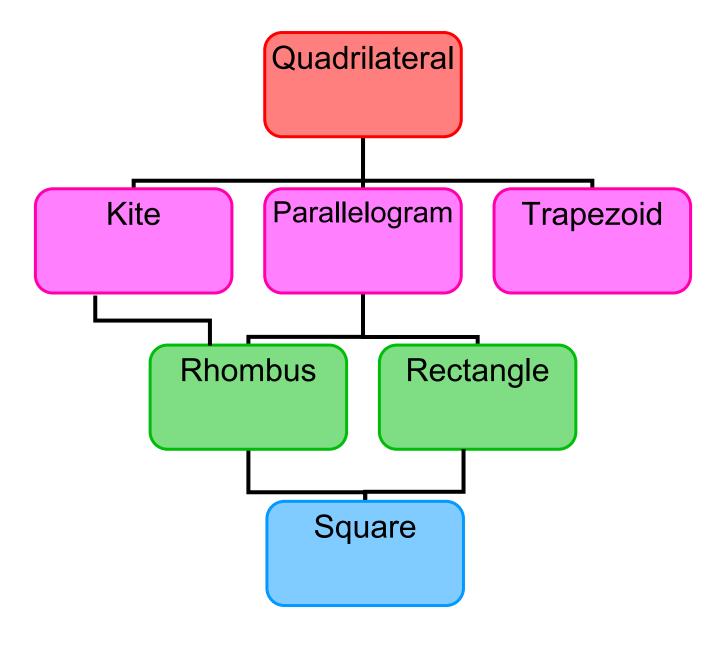
Triangles



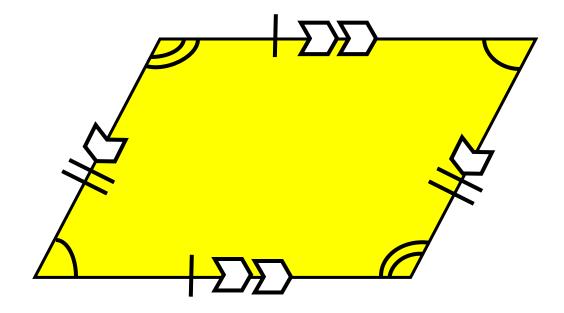
Quadrilaterals



Quadrilaterals Relationships

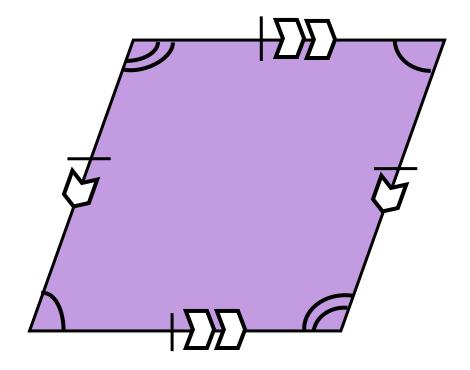


Parallelogram



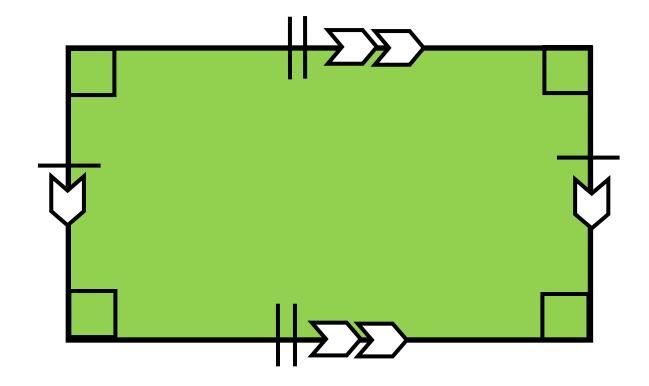
- opposite angles are congruent
- 2 pairs of parallel sides
- 2 pairs of opposite sides congruent

Rhombus



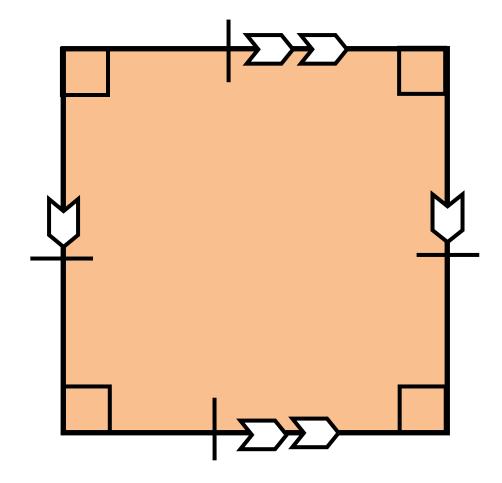
- opposite angles are congruent
- 2 pairs of parallel sides
- 4 congruent sides

Rectangle



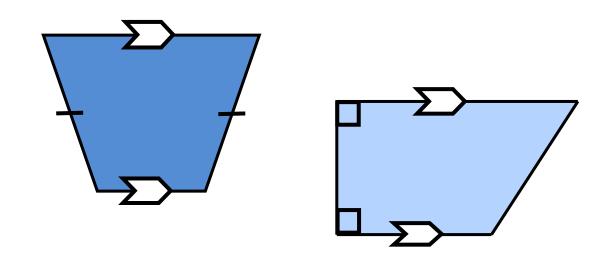
- 4 right angles
- 2 pairs of parallel sides
- 2 pairs of opposite sides congruent

Square



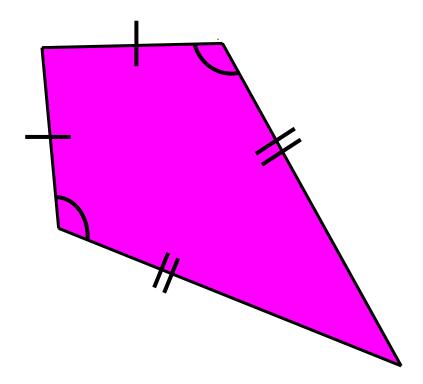
- 4 right angles
- 2 pairs of parallel sides
- 4 congruent sides

Trapezoid



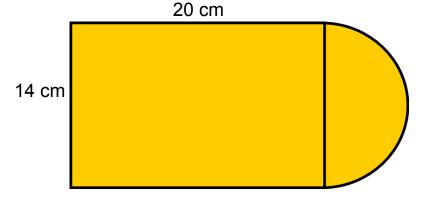
- may have zero or two right angles
- exactly one pair of parallel sides
- may have one pair of congruent sides

Kite

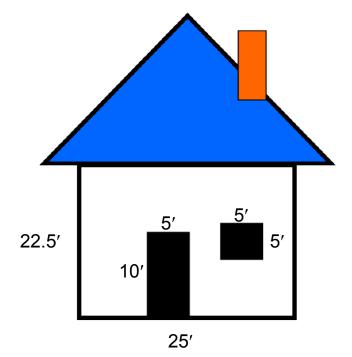


- one pair of opposite congruent angles
- 2 pairs of adjacent congruent sides

Composite Figures

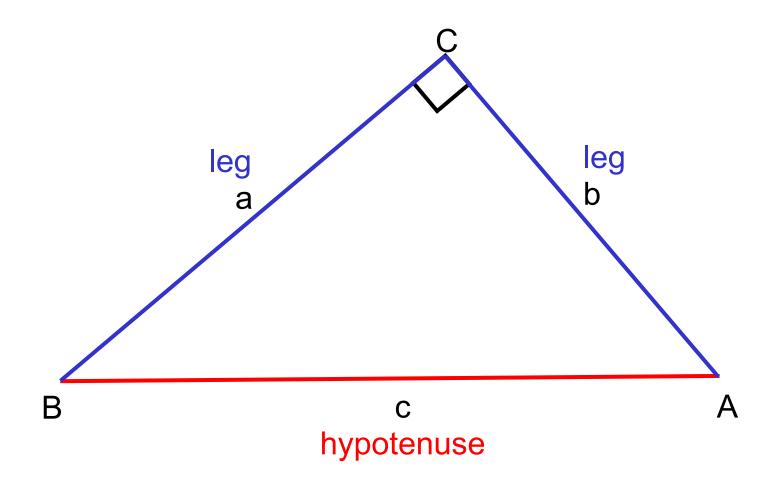


Subdivide into other figures then determine the perimeter.

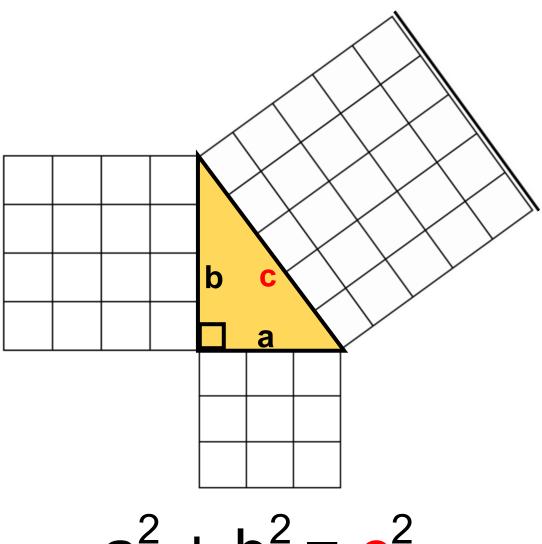


Subdivide into other figures then determine the area.

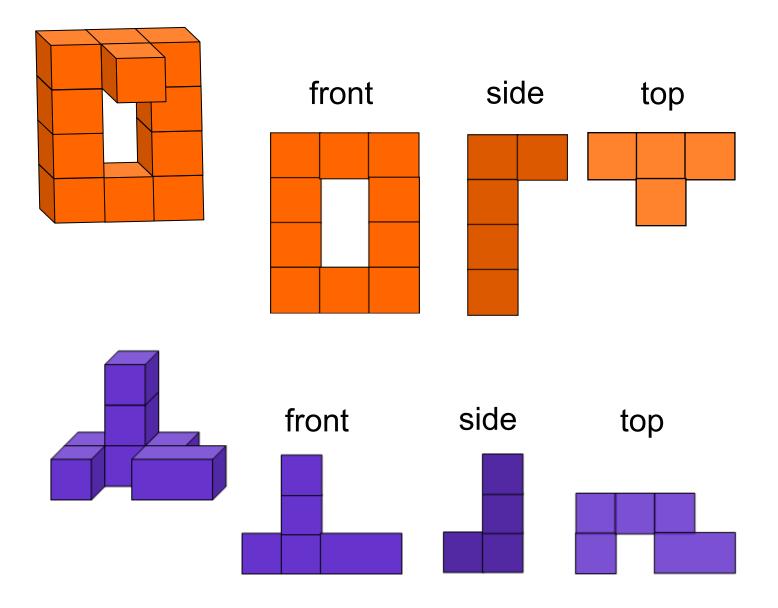
Right Triangle



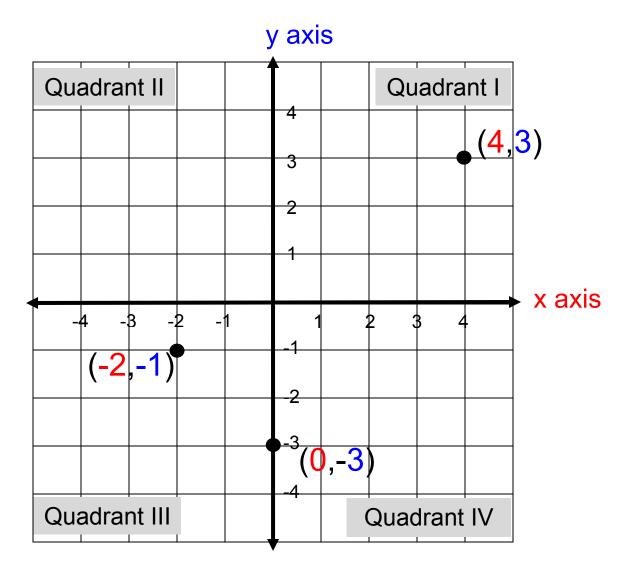
Pythagorean Theorem



Three Dimensional Models

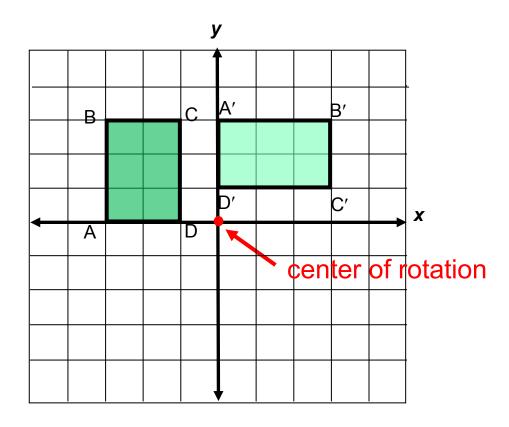


Coordinate Plane



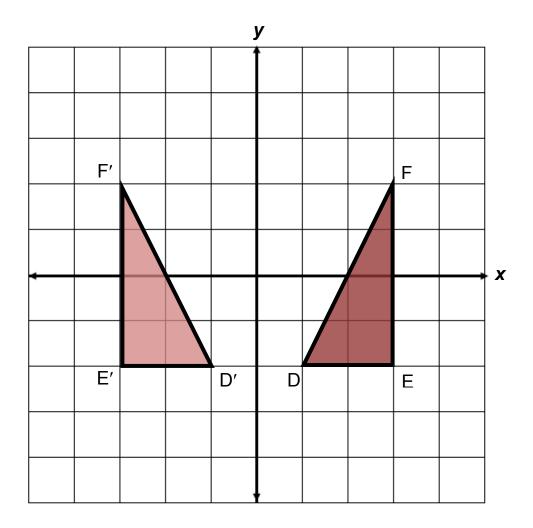
ordered pair (x,y)

Rotation



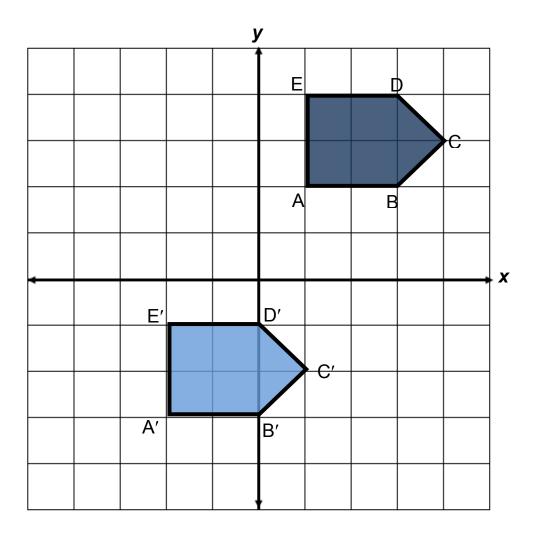
Preimage	Image
A(-3,0)	A'(0,3)
B(-3,3)	B'(3,3)
C(-1,3)	C'(3,1)
D(-1,0)	D'(0,1)

Reflection



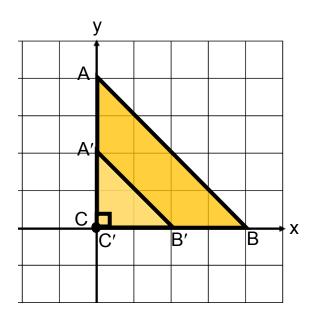
Preimage	Image
D(1,-2)	D'(-1,-2)
E(3,-2)	E'(-3,-2)
F(3,2)	F'(-3,2)

Translation



Preimage	Image
A(1,2)	A'(-2,-3)
B(3,2)	B'(0,-3)
C(4,3)	C'(1,-2)
D(3,4)	D'(0,-1)
E(1,4)	E'(-2,-1)

Dilation



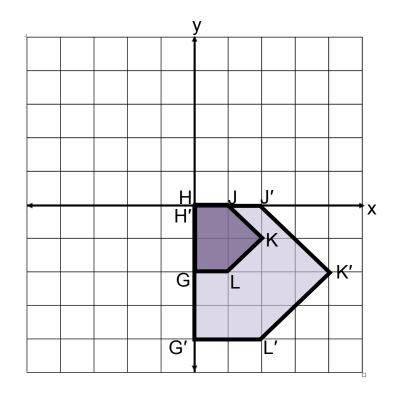
center of dilation =
$$(0,0)$$

scale factor = $\frac{1}{2}$

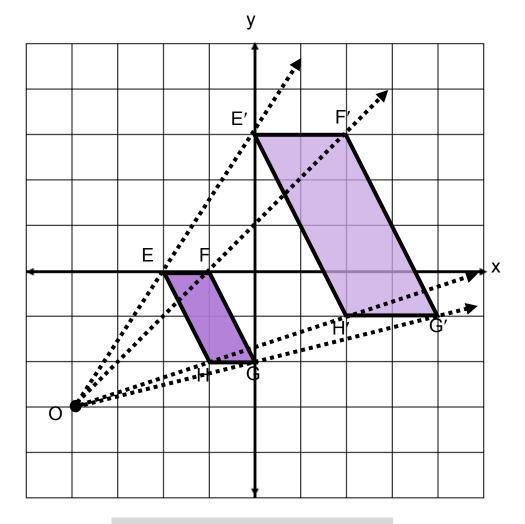
Preimage	Image
A(0,4)	A'(0,2)
B(4,0)	B'(2,0)
C(0,0)	C'(0,0)

center of dilation = (0,0) scale factor = 2

Preimage	Image
G(0,-2)	G'(0,-4)
H(0,0)	H'(0,0)
J(1,0)	J'(2,0)
K(2, -1)	K'(4,-2)
L(1, -2)	L'(2,-4)



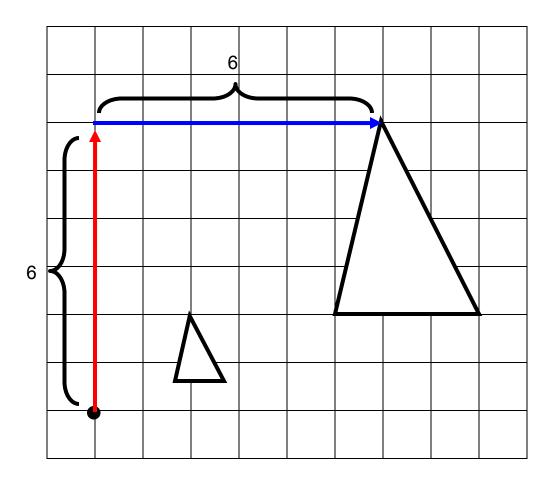
Dilation



center of dilation = (-4,-3) scale factor = 2

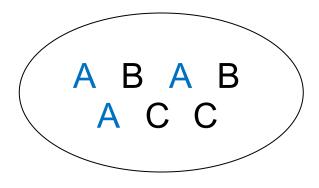
Preimage	Image
E(-2,0)	E'(0,3)
F(-1,0)	F'(2,3)
G(0, -2)	G'(4,-1)
H(-1,-2)	H'(2,-1)

Dilation

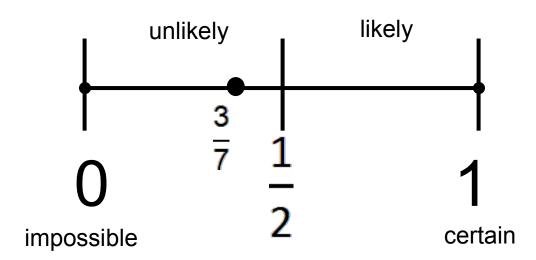


center of dilation = C scale factor = 1/3

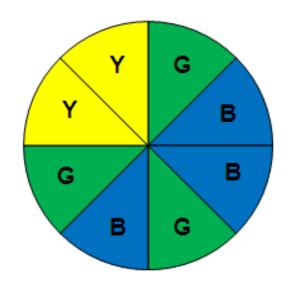
Probability



$$P(A) = \frac{3}{7}$$



Probability of Independent Events



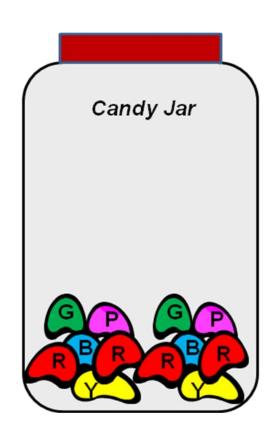
$$P(green) = \frac{3}{8}$$

$$P(yellow) = \frac{2}{8} = \frac{1}{4}$$

P(green and yellow) = P(green) • P(yellow) = $\frac{3}{8} \cdot \frac{1}{4} = \frac{3}{32}$

Probability of Dependent Events

What is the probability of getting a red jelly bean on first pick and then without replacing it, getting a green jelly bean on the second pick?



P(red) • P(green after red) =

$$\frac{4}{12} \cdot \frac{2}{11} = \frac{8}{132} = \frac{2}{33}$$

Fundamental Counting Principle

If there are m ways for one event to occur and n ways for a second event to occur, then there are $m \cdot n$ ways for both events to occur.

Tree Diagram

Joe has two pairs of pants (blue and tan). He also has three shirts (red, green and white). List the possible outfits that Joe can make.

PANTS SHIRTS POSSIBLE OUTCOMES



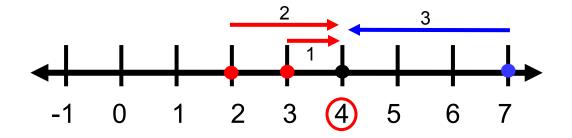
2 · 3 or 6 possible outcomes

Mean

a measure of central tendency

2, 3, 4, 7

Balance Point



Numerical Average

$$\frac{2+3+4+7}{4} = \frac{16}{4} = 4$$

Median

a measure of central tendency

Mode

a measure of central tendency

Data Sets	Mode
2, 3, 3, 3, 5, 5, 9, 10	3
5.2, 5.4, 5.5, 5.6, 5.8, 5.9, 6.0	none
1, 1, 2, 5, 6, 7, 7, 9, 11, 12	1, 7
bir	nodal

Range

Data set

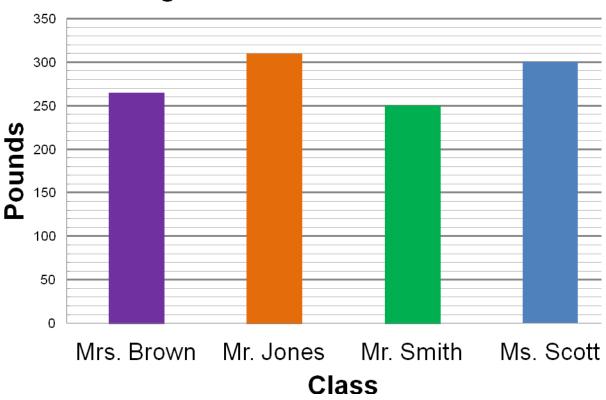
$$2\frac{1}{2}$$
, 3, $3\frac{3}{4}$, $3\frac{7}{8}$, 5, $5\frac{1}{2}$, $9\frac{1}{6}$, $10\frac{4}{5}$, $15\frac{1}{2}$, 20

$$20-2\frac{1}{2}=17\frac{1}{2}$$

Range =
$$17\frac{1}{2}$$

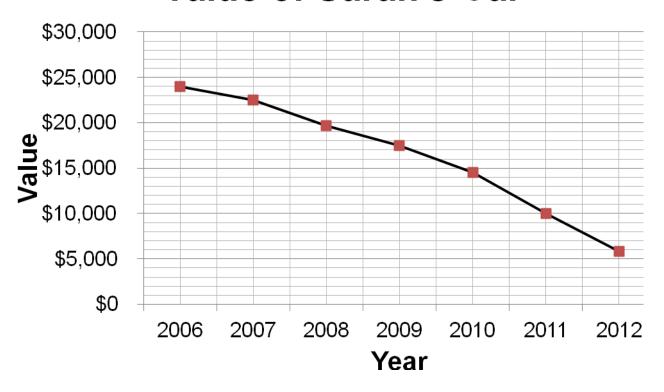
Bar Graph

Pounds of Newspapers Recycled by Lexington Middle School Students



Line Graph

Value of Sarah's Car



Stem-and-Leaf Plot

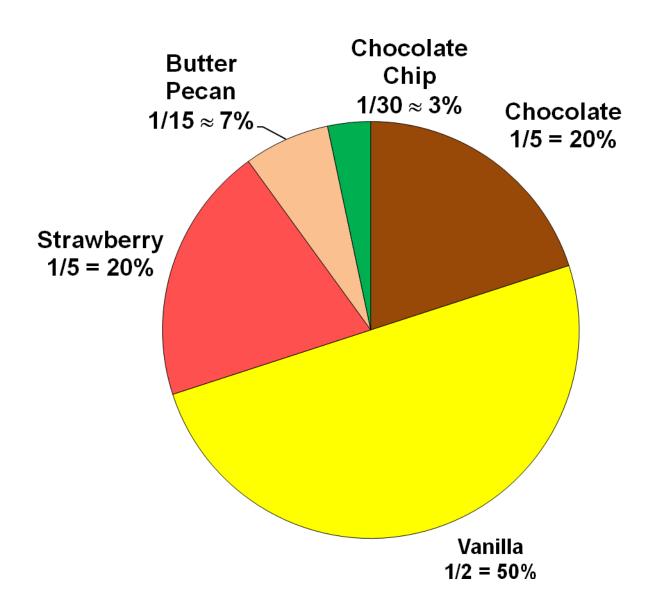
Math Test Scores 56, 65, 98, 82, 64, 71, 78, 86, 95, 91, 59, 70, 80, 92, 76, 82, 85, 91, 92, 73

STEM	LEAF
5	6 9
6	4 5
7	01368
8	02256
9	112258

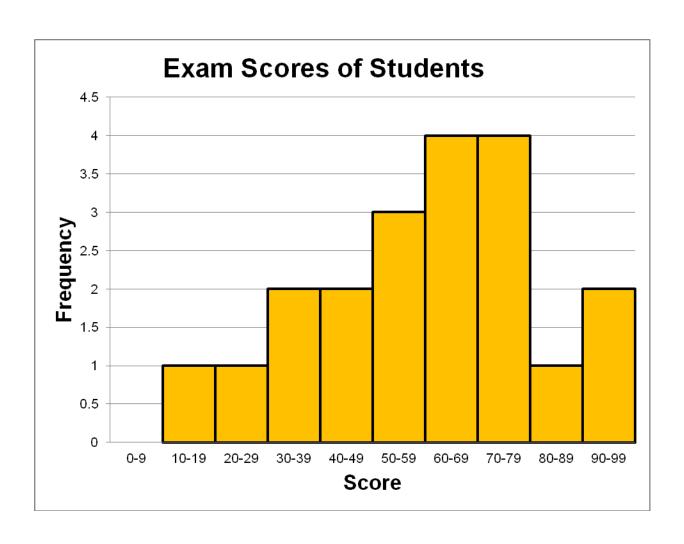
Key: 5|6 means 56

Circle Graph

Favorite Ice Cream

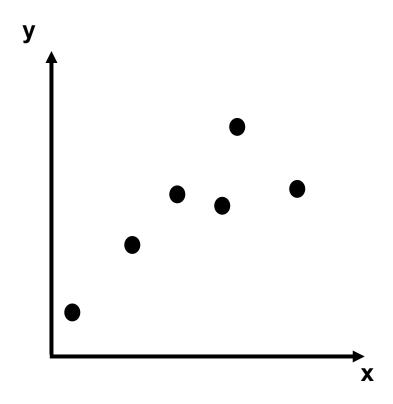


Histogram



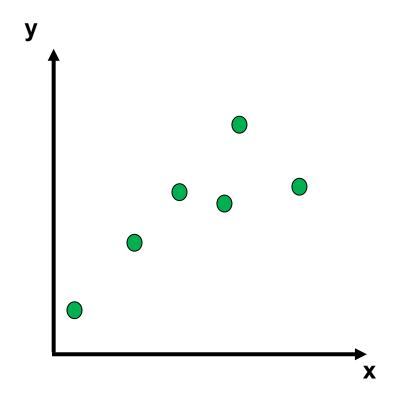
Scatterplot

illustrates the relationship between two sets of data.



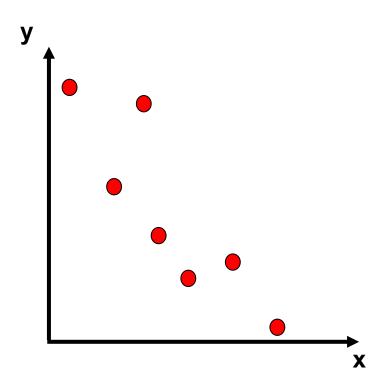
Positive Correlation

y-coordinates increase as x-coordinates increase



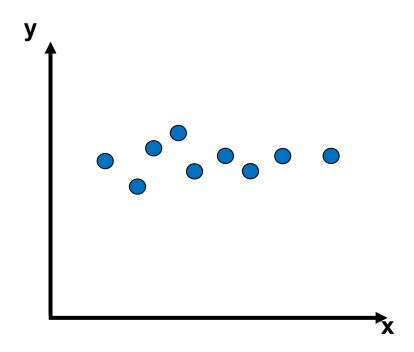
Negative Correlation

y-coordinates decrease as x-coordinates increase



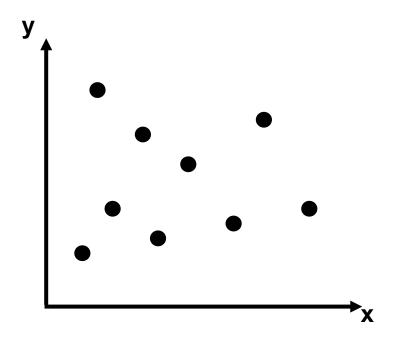
Constant Correlation

y-coordinates remain about the same as x-coordinates increase



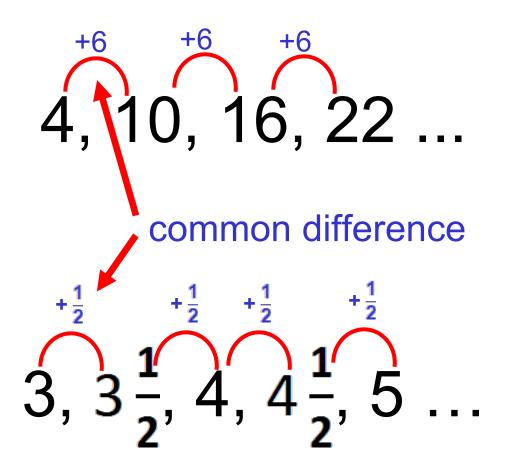
No Correlation

no pattern exists between the x- and y-coordinates



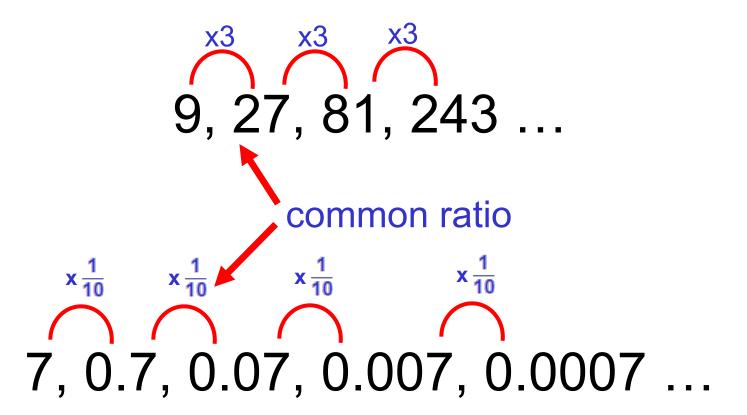
Arithmetic Sequences

What is the next term?



Geometric Sequences

What is the next term?



Additive Identity Property

$$0.3 + 0 = 0.3$$

$$0 + (-7) = -7$$

$$\frac{4}{7} = \frac{0}{7} + \frac{4}{7}$$

$$W + 0 = W$$

Additive Inverse Property

$$1.4 + (-1.4) = 0$$

$$(-9) + 9 = 0$$

$$0 = \frac{4}{7} + \left(-\frac{4}{7}\right)$$

$$x + (-x) = 0$$

Associative Property

Addition:

$$(4+2)+8=4+(2+8)$$

$$x + (3x + \frac{1}{2}) = (x + 3x) + \frac{1}{2}$$

Multiplication:

$$(3 \cdot 1.5) \cdot 6 = 3 \cdot (1.5 \cdot 6)$$

 $2(3x) = (2 \cdot 3)x$

Commutative Property

Addition:

$$2.76 + 3 = 3 + 2.76$$

$$(a + 5) + 7 = (5 + a) + 7$$

Multiplication:

$$-8 \cdot \frac{2}{3} = \frac{2}{3} \cdot (-8)$$

$$y \cdot 9 = 9y$$

Multiplicative Identity Property

$$9 \cdot 1 = 9$$

$$1 \cdot (-10) = -10$$

$$\frac{3}{2} = \frac{3}{2} \cdot 1$$

Multiplicative Inverse Property

$$2 \cdot \frac{1}{2} = 1$$

$$1 = (-\frac{1}{9})^{\frac{1}{9}} -9$$

$$x \cdot \frac{1}{x} = 1 \ (x \neq 0)$$

Multiplicative Property of Zero

$$0 \cdot 8 = 0$$

$$0(-13) = 0$$

$$\frac{5}{6} x \cdot 0 = 0$$

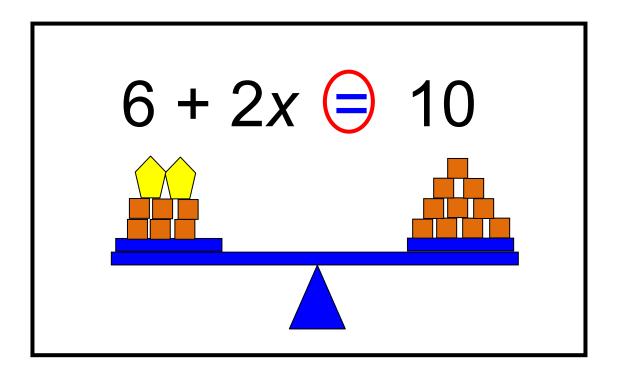
Distributive Property

$$-4(2+3) = -4(2) + -4(3)$$

$$5 \cdot (y - 7) = (5 \cdot y) - (5 \cdot 7)$$

$$(2 \cdot \frac{1}{3}) + (2 \cdot 5) = 2(\frac{1}{3} + 5)$$

Equation



A mathematical sentence stating that two expressions are equal.

$$2.76 + 3 = 3 + 2.76$$

 $3x = 6.9$

Expression

X

$$-\sqrt{26}$$

$$2x + 3^4$$

$$3(y + 3.9) - \frac{8}{9}$$

Variable

$$2(y + 3)$$

$$3 + x = 2.08$$

$$A = \pi r^2$$

Coefficient

$$(-4) + 2x$$

$$(-7)y^2$$

$$\frac{2}{3}ab - \frac{1}{2}$$

Term

$$3x + 2y - 8$$

3 terms

$$-5x^2 + (-2x)$$

2 terms

$$\frac{2}{3}ab$$

1 term

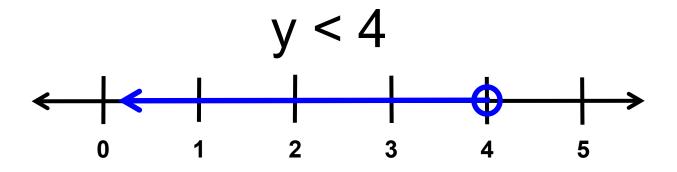
Constant

$$4x-(12)$$

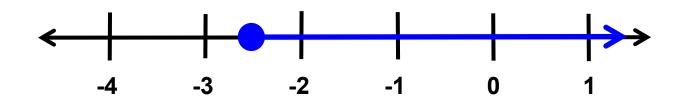
$$7 - 2y + x - 6x^2$$

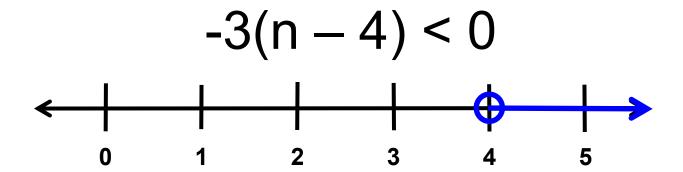
$$3(x + (3.9)) - (\frac{8}{9})$$

Inequality



$$3r \ge -7.5$$





Like Terms

$$4x - 3y + 6x - 7$$

$$2y^{2} - 3y + 7y^{2}$$

$$-5r^{2}(-6) + 2r + 2$$

Relations

 $\{(2,3), (4,1), (2,5)\}$

X	У
2	2
-3	4
5	-1
0	4
1	-6

 $\{(0,4), (0,3), (0,2), (0,1)\}$

Functions

 $\{(2,4), (3,2), (0,2), (-1,2)\}$

X	У
3	2
2	4
0	2
-1	2

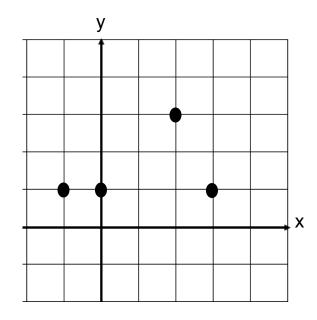


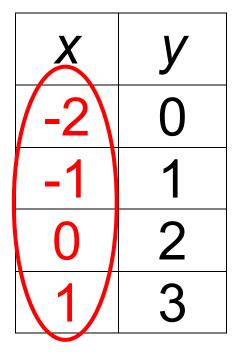
Table of Values

X	У
0	1
1	2
2	5
3	10
4	17

а	1	2	3	4
b	22,500	22,000	21,500	21,000

Domain

$$\{(-2,0), (-1,1), (0,2), (1,3)\}$$



$$\{-2,-1,0,1\}$$

Range

$$\{(-2,0), (-1,1), (0,2), (1,3)\}$$

X	y
-2	0
-1	1
0	2
1	3/

 $\{0, 1, 2, 3\}$

Dependent/ Independent Variable

Determine the distance a car will travel going 55 mph.

$$d = 55h$$

independent

h	d
0	0
1	55
2	110
3	165

dependent

Independent Variable

$$y = 2x + 7$$

x represents the independent variable (input values or domain)

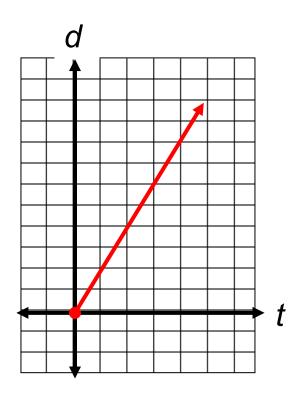
Dependent Variable

$$\bigcirc = 2x + 7$$

y represents the dependent variable (output values or range)

Connecting Representations

The total distance Sam walks depends on how long he walks. If he walks at 2.1 mph, show multiple representations of the relationship.



t	d
0	0
1	2.1
2	4.2
4	8.4

$$d = 2.1t$$

Multistep Equations

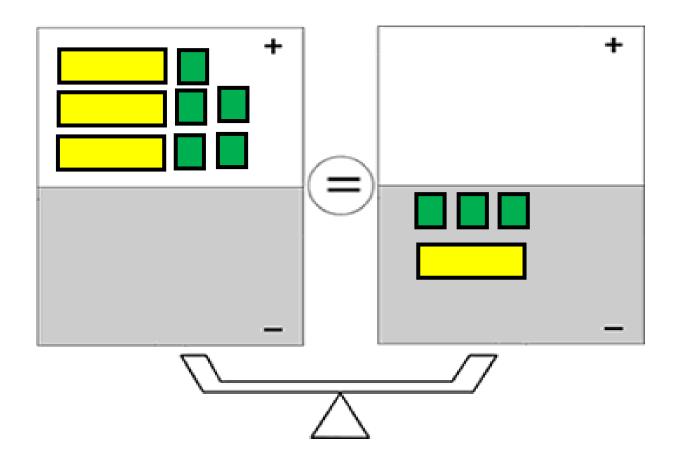
$$2x - 5.7 = -3.4x + 11.04$$

$$\frac{2}{3}(n+9)=-\frac{5}{6}n$$

$$25 = \frac{6p - 5}{-4}$$

Multistep Equation

$$3x + 5 = -3 - x$$



Unit Rate as Slope

A student walks 2 miles per hour

