

MONTESSORI CHECKERBOARD

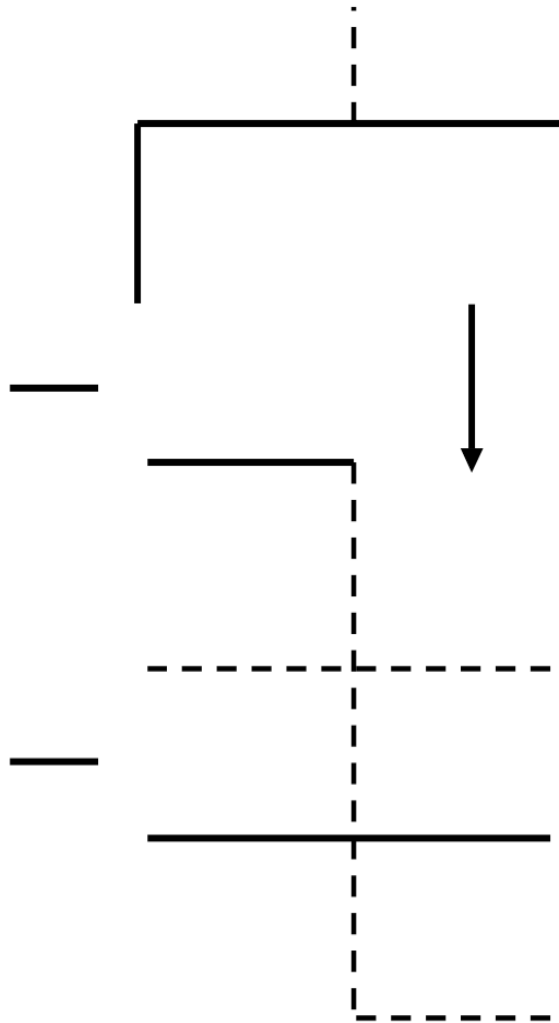
by Mark

1,000,000 million	100,000 hundred thousand	10,000 ten thousand	1,000 thousand	100 hundred	10 ten	1 unit	0.1 tenth	0.01 hundredth	0.001 thousandth	0.0001 ten thousandth	0.00001 hundred thousandth	0.000001 millionth	X
													1,000 thousand
													100 hundred
													10 ten
													1 unit



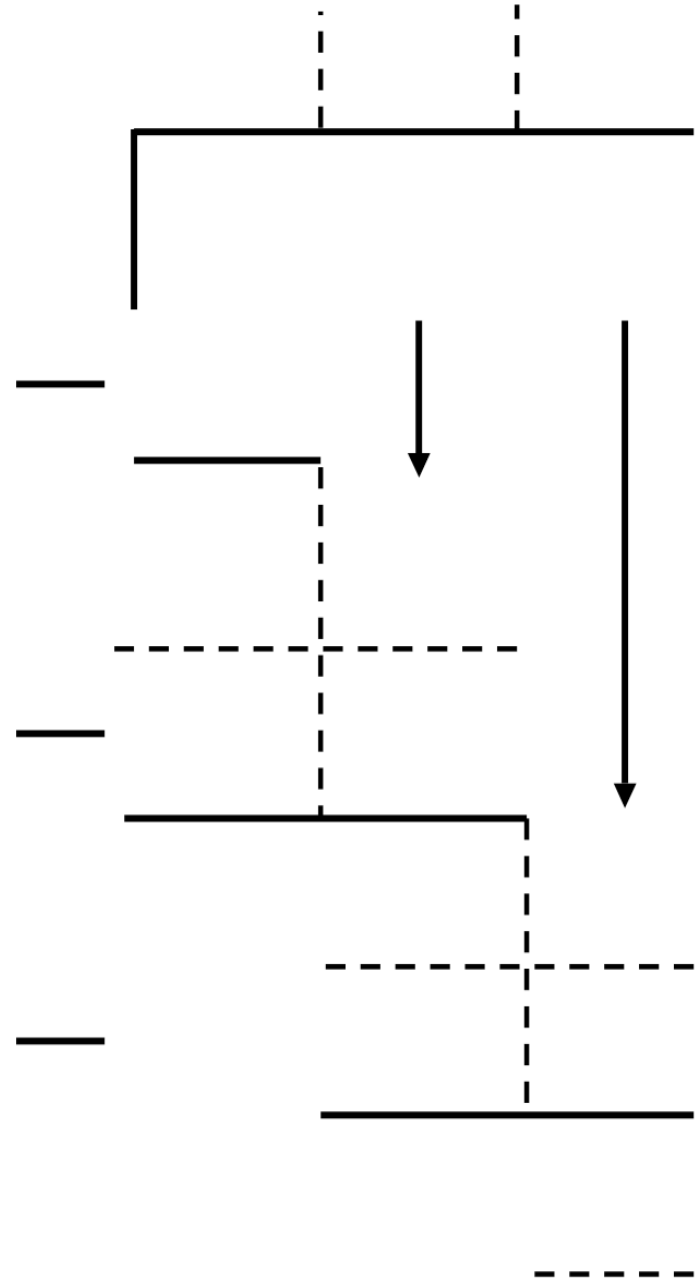
Long Division Chart

Double-digit dividend: Fit it in, Multiply, then Subtract



Long Division Chart

Triple-digit dividend: Fit it in, Multiply, then Subtract



FRACTION/PERCENTAGE CHART

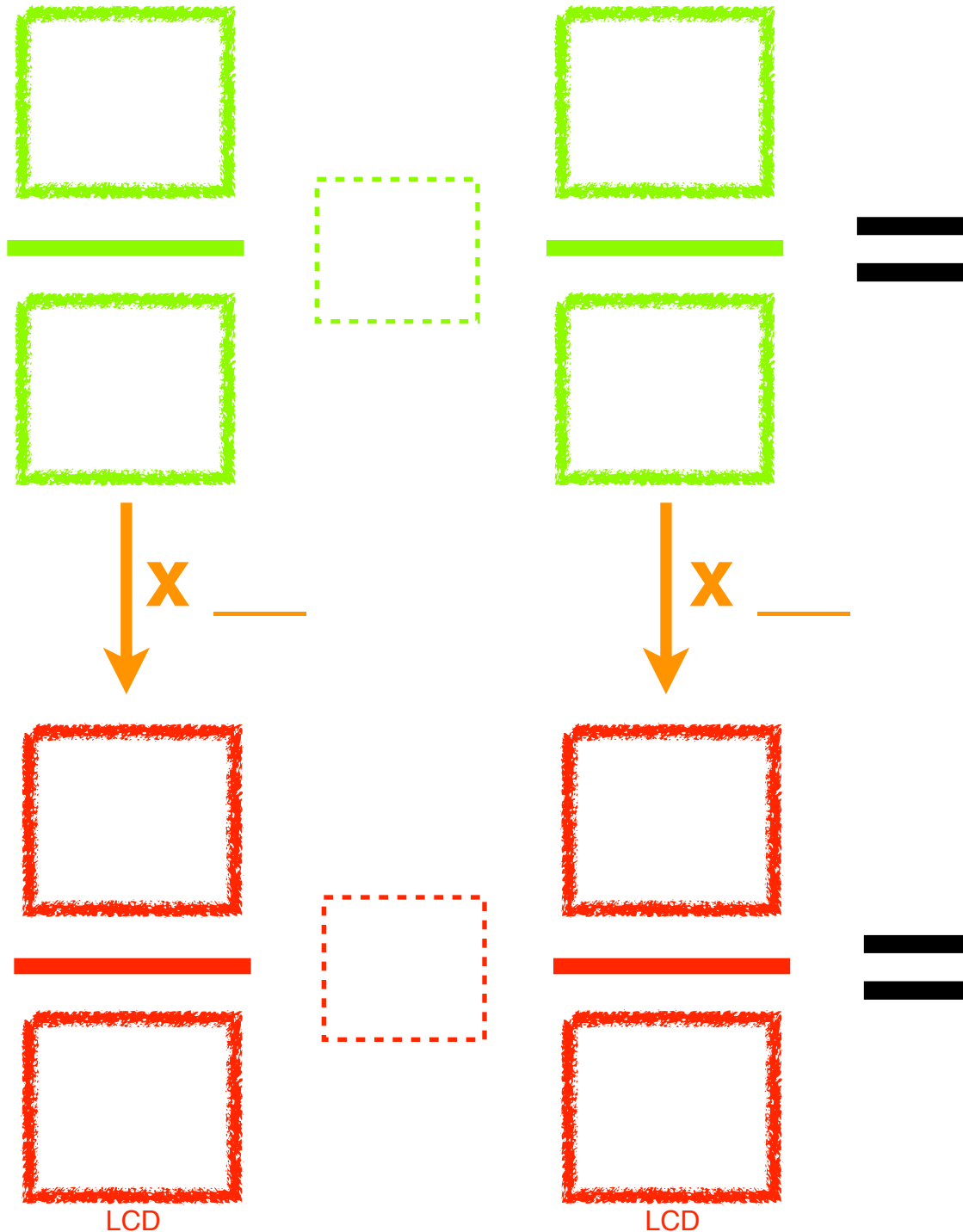
by Mark

1 WHOLE																																																	
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$\frac{1}{15}$			$\frac{2}{15}$			$\frac{3}{15}$			$\frac{4}{15}$			$\frac{5}{15}$			$\frac{6}{15}$			$\frac{7}{15}$			$\frac{8}{15}$			$\frac{9}{15}$			$\frac{10}{15}$			$\frac{11}{15}$			$\frac{12}{15}$			$\frac{13}{15}$			$\frac{14}{15}$			$\frac{15}{15}$							
$\frac{1}{20}$		$\frac{2}{20}$		$\frac{3}{20}$		$\frac{4}{20}$		$\frac{5}{20}$		$\frac{6}{20}$		$\frac{7}{20}$		$\frac{8}{20}$		$\frac{9}{20}$		$\frac{10}{20}$		$\frac{11}{20}$		$\frac{12}{20}$		$\frac{13}{20}$		$\frac{14}{20}$		$\frac{15}{20}$		$\frac{16}{20}$		$\frac{17}{20}$		$\frac{18}{20}$		$\frac{19}{20}$		$\frac{20}{20}$											
$\frac{1}{25}$	$\frac{2}{25}$	$\frac{3}{25}$	$\frac{4}{25}$	$\frac{5}{25}$	$\frac{6}{25}$	$\frac{7}{25}$	$\frac{8}{25}$	$\frac{9}{25}$	$\frac{10}{25}$	$\frac{11}{25}$	$\frac{12}{25}$	$\frac{13}{25}$	$\frac{14}{25}$	$\frac{15}{25}$	$\frac{16}{25}$	$\frac{17}{25}$	$\frac{18}{25}$	$\frac{19}{25}$	$\frac{20}{25}$	$\frac{21}{25}$	$\frac{22}{25}$	$\frac{23}{25}$	$\frac{24}{25}$	$\frac{25}{25}$																									
$\frac{1}{30}$	$\frac{2}{30}$	$\frac{3}{30}$	$\frac{4}{30}$	$\frac{5}{30}$	$\frac{6}{30}$	$\frac{7}{30}$	$\frac{8}{30}$	$\frac{9}{30}$	$\frac{10}{30}$	$\frac{11}{30}$	$\frac{12}{30}$	$\frac{13}{30}$	$\frac{14}{30}$	$\frac{15}{30}$	$\frac{16}{30}$	$\frac{17}{30}$	$\frac{18}{30}$	$\frac{19}{30}$	$\frac{20}{30}$	$\frac{21}{30}$	$\frac{22}{30}$	$\frac{23}{30}$	$\frac{24}{30}$	$\frac{25}{30}$	$\frac{26}{30}$	$\frac{27}{30}$	$\frac{28}{30}$	$\frac{29}{30}$	$\frac{30}{30}$																				
$\frac{1}{40}$	$\frac{2}{40}$	$\frac{3}{40}$	$\frac{4}{40}$	$\frac{5}{40}$	$\frac{6}{40}$	$\frac{7}{40}$	$\frac{8}{40}$	$\frac{9}{40}$	$\frac{10}{40}$	$\frac{11}{40}$	$\frac{12}{40}$	$\frac{13}{40}$	$\frac{14}{40}$	$\frac{15}{40}$	$\frac{16}{40}$	$\frac{17}{40}$	$\frac{18}{40}$	$\frac{19}{40}$	$\frac{20}{40}$	$\frac{21}{40}$	$\frac{22}{40}$	$\frac{23}{40}$	$\frac{24}{40}$	$\frac{25}{40}$	$\frac{26}{40}$	$\frac{27}{40}$	$\frac{28}{40}$	$\frac{29}{40}$	$\frac{30}{40}$	$\frac{31}{40}$	$\frac{32}{40}$	$\frac{33}{40}$	$\frac{34}{40}$	$\frac{35}{40}$	$\frac{36}{40}$	$\frac{37}{40}$	$\frac{38}{40}$	$\frac{39}{40}$	$\frac{40}{40}$										
$\frac{1}{50}$	$\frac{2}{50}$	$\frac{3}{50}$	$\frac{4}{50}$	$\frac{5}{50}$	$\frac{6}{50}$	$\frac{7}{50}$	$\frac{8}{50}$	$\frac{9}{50}$	$\frac{10}{50}$	$\frac{11}{50}$	$\frac{12}{50}$	$\frac{13}{50}$	$\frac{14}{50}$	$\frac{15}{50}$	$\frac{16}{50}$	$\frac{17}{50}$	$\frac{18}{50}$	$\frac{19}{50}$	$\frac{20}{50}$	$\frac{21}{50}$	$\frac{22}{50}$	$\frac{23}{50}$	$\frac{24}{50}$	$\frac{25}{50}$	$\frac{26}{50}$	$\frac{27}{50}$	$\frac{28}{50}$	$\frac{29}{50}$	$\frac{30}{50}$	$\frac{31}{50}$	$\frac{32}{50}$	$\frac{33}{50}$	$\frac{34}{50}$	$\frac{35}{50}$	$\frac{36}{50}$	$\frac{37}{50}$	$\frac{38}{50}$	$\frac{39}{50}$	$\frac{40}{50}$	$\frac{41}{50}$	$\frac{42}{50}$	$\frac{43}{50}$	$\frac{44}{50}$	$\frac{45}{50}$	$\frac{46}{50}$	$\frac{47}{50}$	$\frac{48}{50}$	$\frac{49}{50}$	$\frac{50}{50}$

100%															
50%					100%										
33%			66%			100%									
25%		50%			75%			100%							
20%		40%		60%		80%		100%							
16.6%		33%		50%		66%		83%		100%					
14.2%		28.5%		42.8%		57.1%		71.4%		85.7%	100%				
12.5%		25%		37.5%		50%		62.5%		75%	87.5%	100%			
11.1%		22.2%		33%		44.4%		55.5%		66%	77.7%	88.8%	100%		
10%	20%		30%		40%		50%		60%		70%		80%	90%	100%

ADDING & SUBTRACTING FRACTIONS

by Mark



DIRECTIONS:

Before you can add or subtract fractions with different denominators, you must first find equivalent fractions with the same denominator.

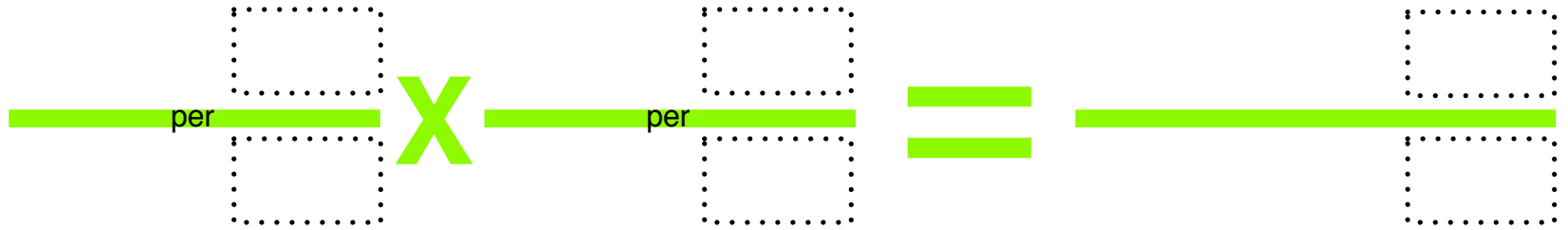
1. Write the original equation in the green area.
2. Find the smallest multiple (Lowest Common Multiple - LCM) of both numbers in the green denominator.
3. Write this number in both of the red denominators*.
4. Multiply each green numerator by the same number that was needed to get the red denominator. Write these numbers next to the orange multiplication signs.
5. Solve the red equation with the common denominators. Reduce if necessary.

*When working with fractions, the LCM is called the least common denominator (LCD).

MEASUREMENT CONVERSIONS

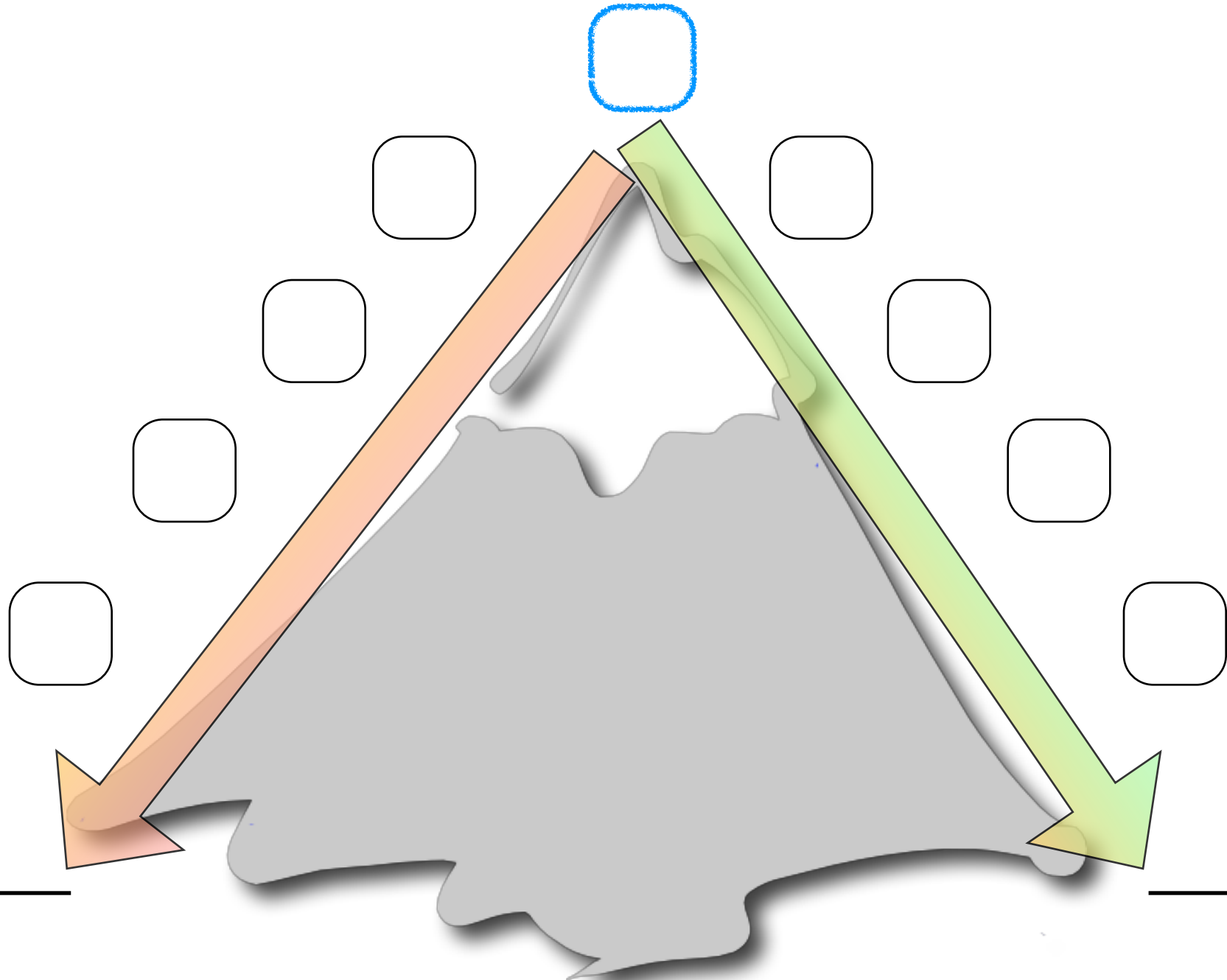
by Mark

CONVERSIONS	
1 ft	12 in
1 yd	3 ft
1 mi	5,280 ft
1 mi	1,760 yd
1 m	100 cm
1 km	1,000 m
1 c	8 oz
1 pt	2 c
1 qt	2 pt
1 gal	4 qt
1 kg	1,000 g
1 g	1,000 mg
1 hr	60 min.
1 day	24 hr
1 yr	52 weeks
1 week	7 days
1 l	1,000 ml
1 kl	1,000 l
1 lb	16 oz
1 ton	2,000 lbs



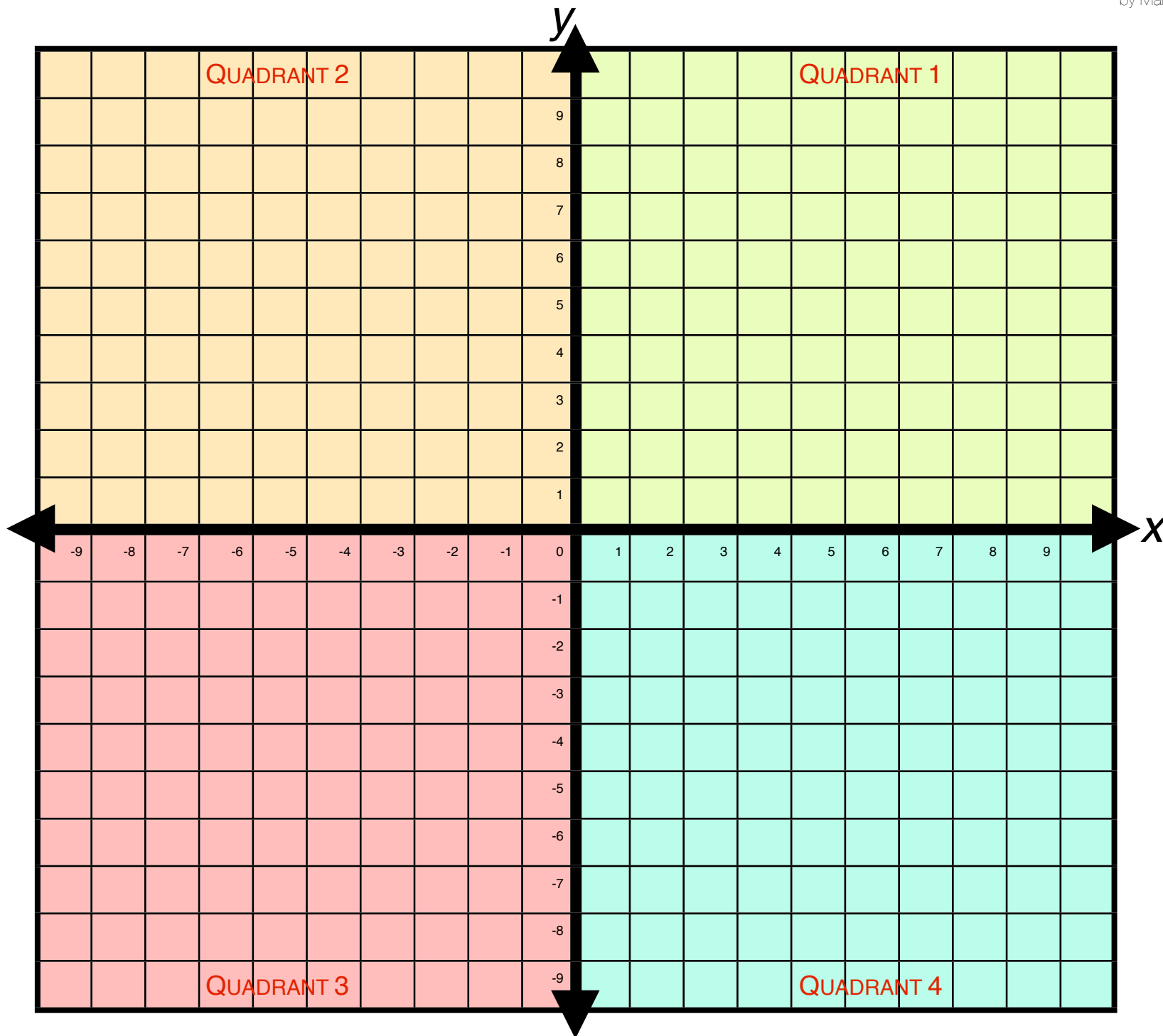
ROUNDING MOUNTAIN

by Mark



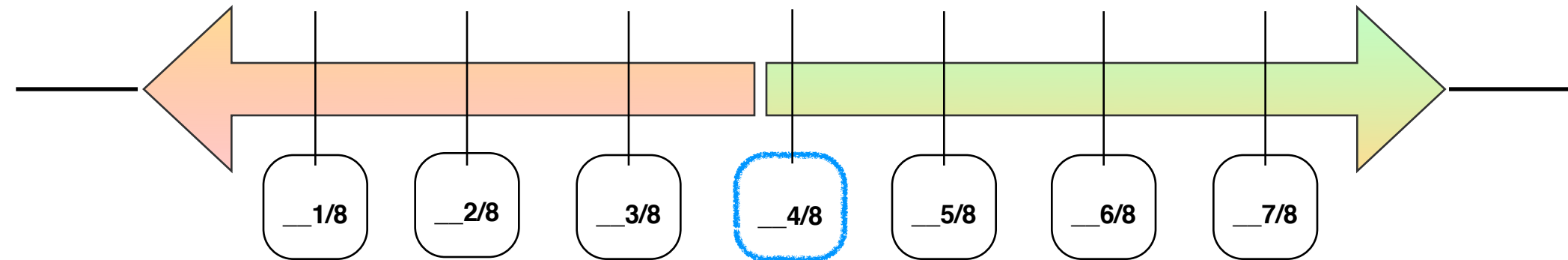
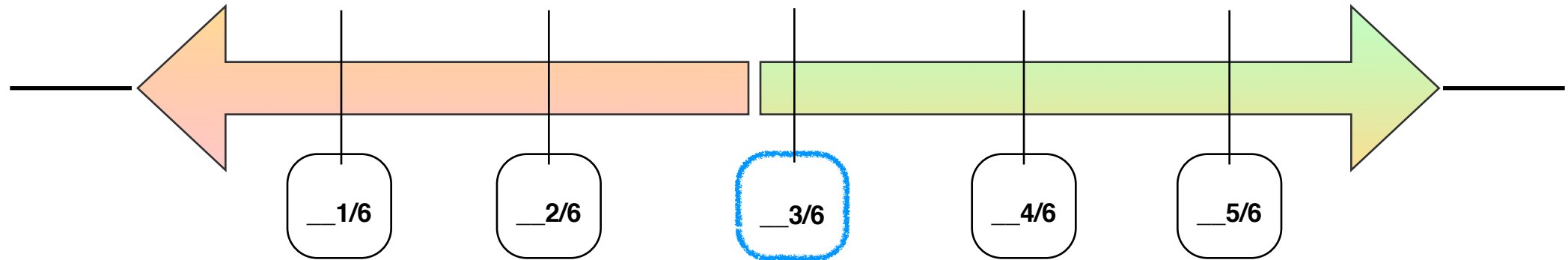
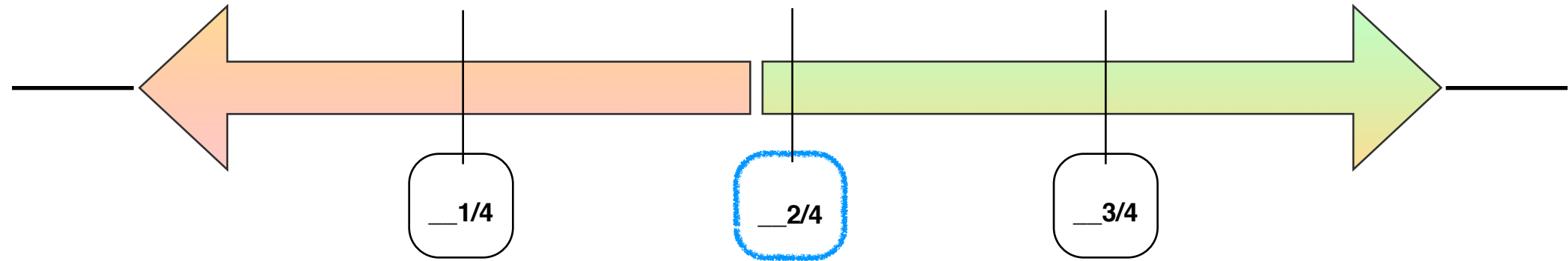
COORDINATE GRAPHING/PLANE

by Mark



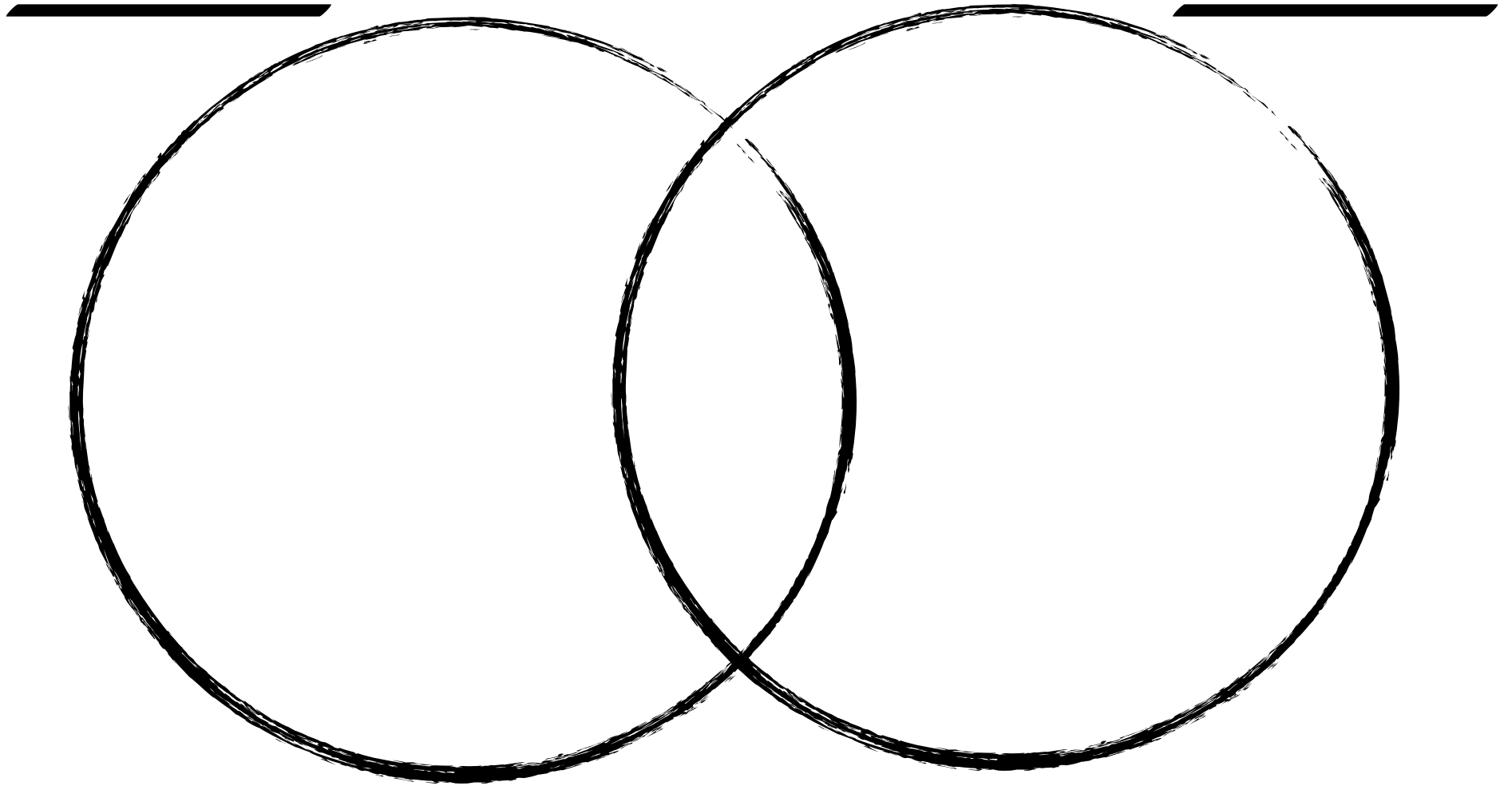
ROUNDING FRACTION NUMBER LINES

by Mark



G.C.F. & L.C.M.

by Mark



Math Reference Sheet

Multiplication

X	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

Key Words

Addition	sum, total, plus, altogether, in all
+	
Subtraction	remainder, fewer, difference, minus, than, how many more
-	
Multiplication	product, times, twice, total, each, multiply by
x	
Division	quotient, goes into, split equally, each
÷	

Place Value

Place Value									
Millions			Thousands			Ones		Decimals	
Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	Decimals
7	8	9	1	2	3	4	5	6	.7 8 9

Formulas

Perimeter of a Rectangle	$(2L) + (2W)$
Perimeter of a Square	$4 \times s$
Circumference	$D \times \pi$
Area of a Square or Rectangle	$L \times W$
Volume	$L \times W \times H$

Fractions

Fractions							
1							
$\frac{1}{2}$				$\frac{1}{2}$			
$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$	
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

Polygons

Triangle	Quadrilateral	Pentagon	Hexagon
Octagon	Rhombus	Trapezoid	Right Triangle

Types of Lines

Line	Ray	Line Segment	Parallel Lines	Perpendicular Lines	Intersecting Lines

Types of Triangles

Equilateral	Isosceles	Scalene

Simple Steps for Solving Word Problems in Math

Look for the **nouns** that are counted.

List each **noun** and the **quantity of each** (write the numbers shown).

Look for the **operation clue word** and use it to write the solution statement with the number sentence.

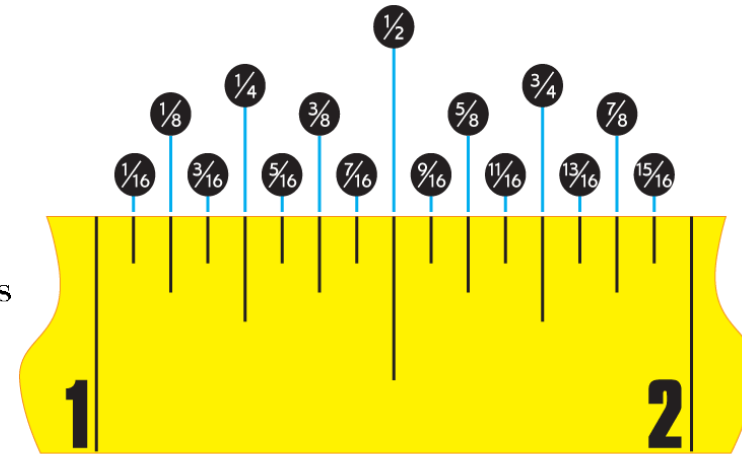
Do your working. That's when you add, subtract, multiply or divide to get your answer.

Carry the answer and attach the noun to it.

Include your units!

CONVERSIONS

1 ft	12 in
1 yd	3 ft
1 mi	5,280 ft
1 mi	1,760 yd
1 m	100 cm
1 km	1,000 m
1 c	8 oz
1 pt	2 c
1 qt	2 pt
1 gal	4 qt
1 kg	1,000 g
1 g	1,000 mg
1 hr	60 min.
1 day	24 hr
1 yr	52 weeks
1 week	7 days
1 l	1,000 ml
1 kl	1,000 l
1 lb	16 oz
1 ton	2,000 lbs



Standard Tape Measure Showing Inch Breakdown

$$2 \times 2 = 2^2 = 4$$

$$2 \times 2 \times 2 = 2^3 = 8$$

$$2 \times 2 \times 2 \times 2 = 2^4 = 16$$

$$2 \times 2 \times 2 \times 2 \times 2 = 2^5 = 32$$

$$2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^6 = 64$$

$$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^7 = 128$$

RULES FOR FRACTIONS

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

$$\frac{a}{b} \pm \frac{c}{d} = \frac{ad \pm bc}{bd}$$

$$\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}$$

PEMDAS

Please Excuse My Dear Aunt Sally
(Parenthesis) (Exponents) (Multiplication) (Division) (Addition) (Subtraction)

Step 1: Parenthesis $5^2 + (3 - 1) / 2 - 4 \times 1$

Step 2: Exponents $5^2 + 2 / 2 - 4 \times 1$

Step 3: Multiply and Divide $25 + 2 / 2 - 4 \times 1$
(Perform the operation that comes first)

Step 4: Add and Subtract $25 + 1 - 4$
(Perform the operation that comes first)

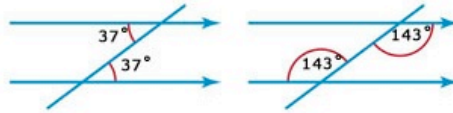
Solution **22**

Angles

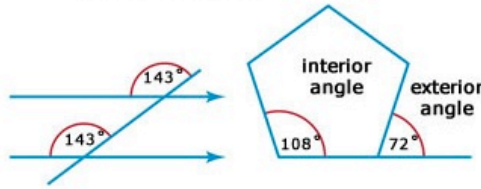


right angle

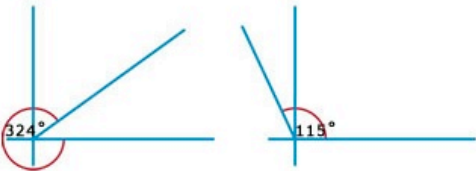
acute angle



alternate angles (also Z angles)

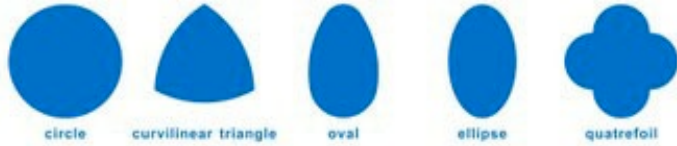


corresponding angles (also F angles)



reflex angle

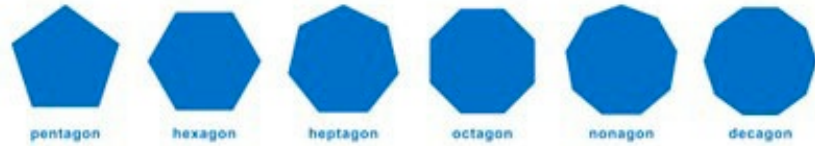
obtuse angle



circle curvilinear triangle oval ellipse quatrefoil



square rectangle trapezoid rhombus parallelogram kite chevron quadrilateral



pentagon hexagon heptagon octagon nonagon decagon

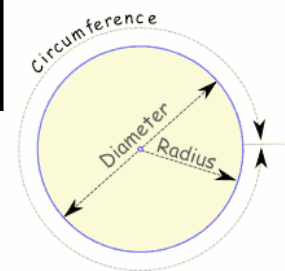
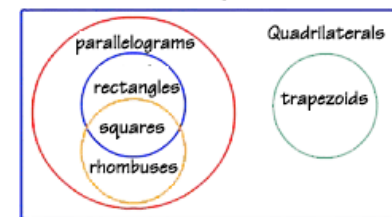


equilateral triangle acute angled isosceles triangle right angled isosceles triangle obtuse angled isosceles triangle acute angled scalene triangle right angled scalene triangle obtuse angled scalene triangle

GEOMETRY SHAPES AND SOLIDS

SQUARE $P = 4s$ $A = s^2$	RECTANGLE $P = 2a + 2b$ $A = ab$	CIRCLE $P = 2\pi r$ $A = \pi r^2$
TRIANGLE $P = a + b + c$ $A = \frac{1}{2}bh$	PARALLELOGRAM $P = 2a + 2b$ $A = bh$	CIRCULAR SECTOR $L = \pi r \frac{\theta}{180^\circ}$ $A = \pi r^2 \frac{\theta}{360^\circ}$
PYTHAGOREAN THEOREM $a^2 + b^2 = c^2$ $c = \sqrt{a^2 + b^2}$	CIRCULAR RING $A = \pi(R^2 - r^2)$	SPHERE $S = 4\pi r^2$ $V = \frac{4\pi r^3}{3}$
TRAPEZOID $P = a + b + c + d$ $A = h \frac{a+b}{2}$	RECTANGULAR BOX $A = 2ab + 2ac + 2bc$ $V = abc$	RIGHT CIRCULAR CONE $A = \pi r^2 + \pi r s$ $s = \sqrt{r^2 + h^2}$ $V = \frac{1}{3} \pi r^2 h$
CUBE $A = 6l^2$ $V = l^3$	CYLINDER $A = 2\pi r(r + h)$ $V = \pi r^2 h$	FRUSTUM OF A CONE $V = \frac{1}{3} \pi h(r^2 + rR + R^2)$

Venn Diagram



$$\frac{\text{Circumference}}{\text{Diameter}} = \pi = 3.14159...$$

Math Reference by Mark

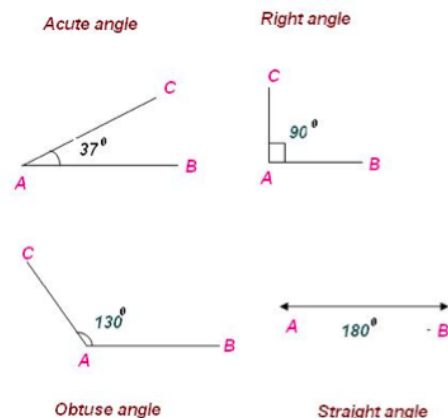
= equal to	$1 = 1.0 = 100\%$
≠ not equal to	$1/2 = 0.5 = 50\%$
> greater than	$1/3 = .333 = 33.3\%$
< less than	$1/4 = 0.25 = 25\%$
≥ greater than or equal to	$1/5 = 0.20 = 20\%$
≤ less than or equal to	$1/6 = 0.166 = 16.6\%$
perimeter = total distance around	$1/8 = 0.125 = 12.5\%$
area = length x width = L x W	$1/9 = .111 = 11.1\%$
1 mile = 5, 280 feet	$1/10 = 0.1 = 10\%$
1 yard = 3 feet	$1/12 = 0.083 = 8.3\%$
1 foot = 12 inches	$2/3 = .666 = 66.6\%$
1 kilometer = 1,000 meters	$3/4 = 0.75 = 75\%$
1 meter = 100 centimeters	$4/5 = 0.80 = 80\%$

thousand	hundred	ten	unit	tenth	hundredth	thousandth
1,000	100	10	1	.1	.01	.001

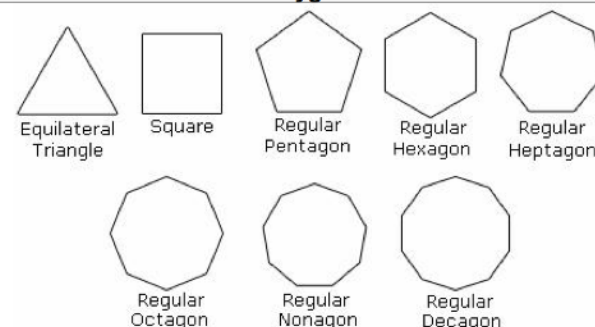
Multiplication/Division Table

x ÷	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

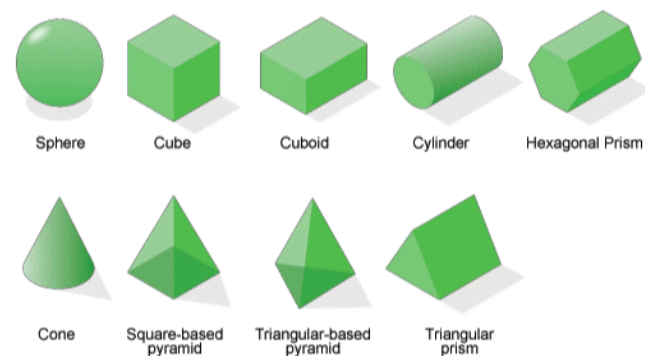
Angles



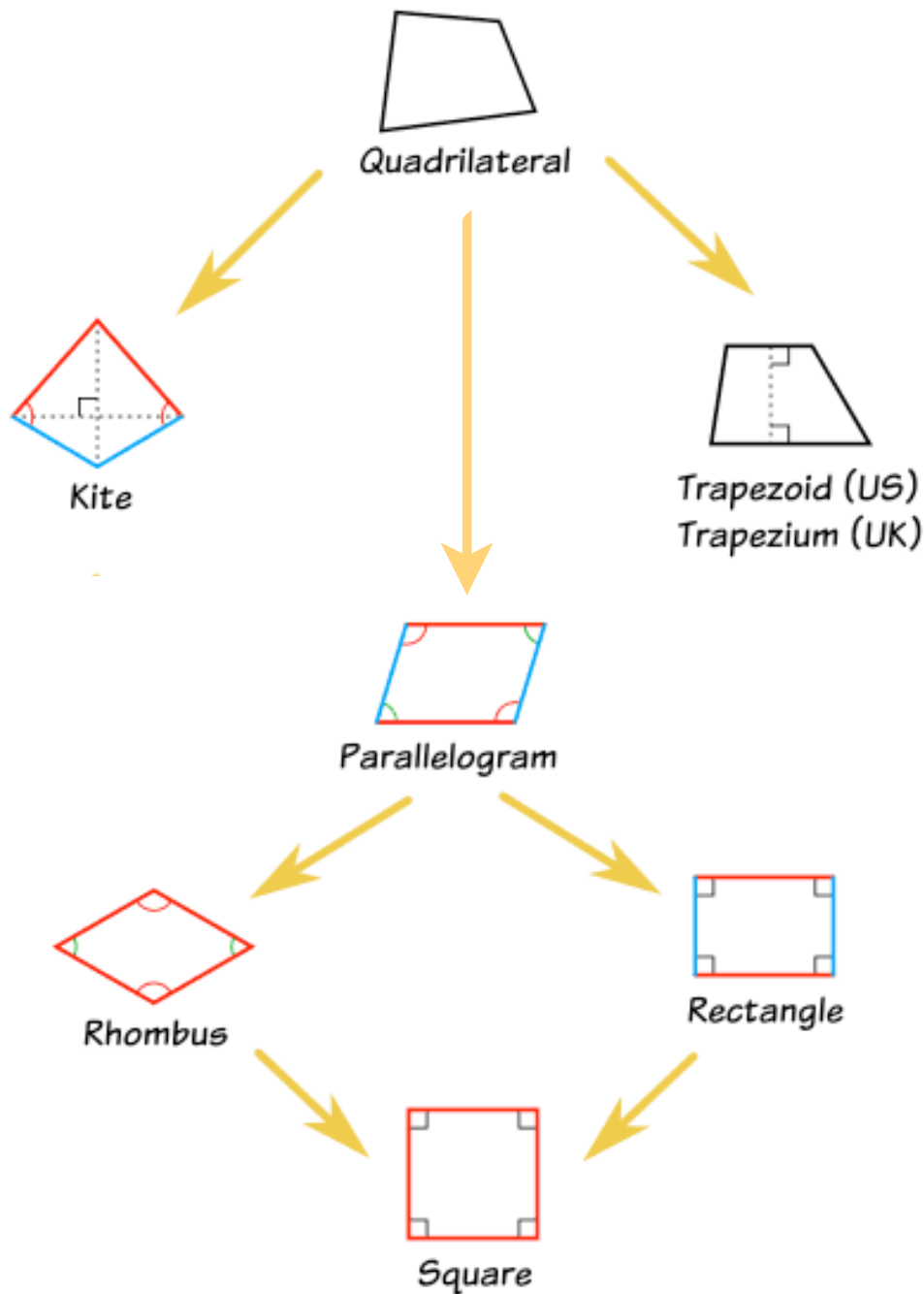
Polygons



Solids (3D)



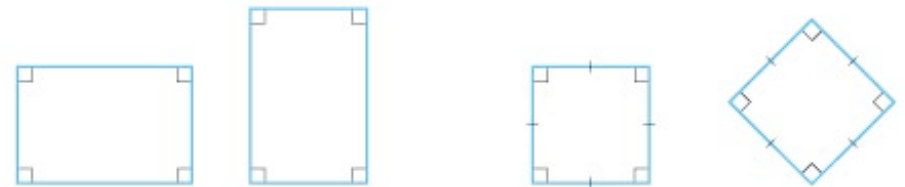
QUADRILATERAL FAMILY TREE



A **trapezoid** is a quadrilateral with one and only one pair of parallel sides.

A **parallelogram** is a quadrilateral with two pairs of parallel sides.

A **rhombus** is a quadrilateral with four congruent sides.



A **rectangle** is a quadrilateral with four right angles.

A **square** is a quadrilateral with four congruent sides and four right angles.

Venn Diagram

