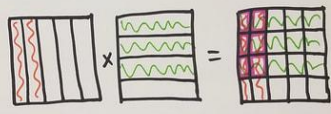
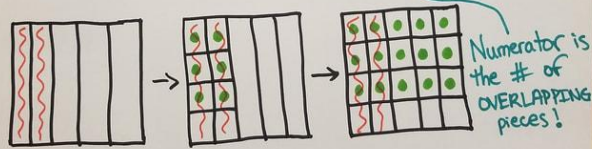


Fraction x Fraction

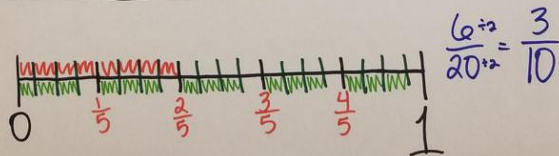
Step 1: Multiply the numerators.
Step 2: Multiply the denominators.
Step 3: Simplify!

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20} = \frac{3}{10}$$


Model with Fraction Bars: $\frac{6}{20} = \frac{3}{10}$



Model with a Number Line:



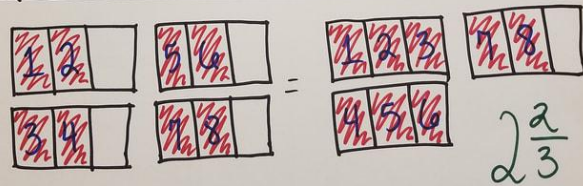
Fraction x Whole

Step 1: Rewrite whole # as a fraction (over 1).
Step 2: Multiply the fractions (straight across).
Step 3: Simplify!

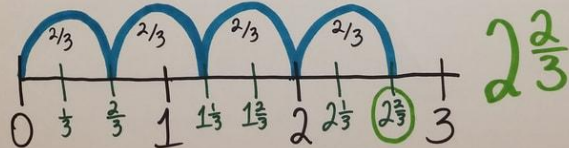
$$4 \times \frac{2}{3} = \frac{4}{1} \times \frac{2}{3} = \frac{8}{3} = 2\frac{2}{3}$$

★ If needed, convert the improper fraction into a mixed #!

Model with Fraction Bars:



Model with a Number Line:



Multiplying Mixed #s

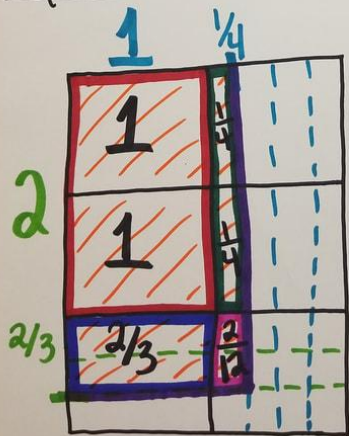
Step 1:
Convert mixed
#s into improper
fractions.

Step 2:
Multiply the
fractions
(straight across).

Step 3:
Convert back
into a Mixed
(Divide!).

$$2\frac{2}{3} \times 1\frac{1}{4} = \frac{8}{3} \times \frac{5}{4} = \frac{40}{12} = 3\frac{4}{12} \rightarrow 3\frac{1}{3}$$

Model with Area Model:



$$\begin{aligned} (2 \times 1) &= 2 = 2 \\ (2 \times \frac{1}{4}) &= \frac{2}{4} = \frac{1}{2} \\ (\frac{2}{3} \times 1) &= \frac{2}{3} \\ (\frac{2}{3} \times \frac{1}{4}) &= \frac{2}{12} = \frac{1}{6} \end{aligned}$$

$$3\frac{4}{12} \leftarrow 2\frac{16}{12}$$

Adding Fractions

1. Find a common
denominator (if
they are unlike).

$$1\frac{1}{2} \times \frac{4}{4} = 1\frac{4}{8}$$

$$+ \frac{5}{8} = + \frac{5}{8}$$

$$1\frac{9}{8}$$

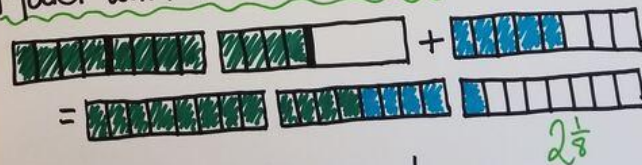
2. Add the numerators
+ any whole #s.

3. Keep the NEW
denominator.

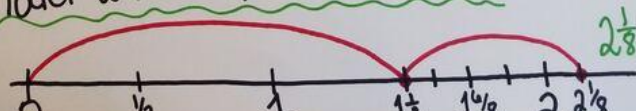
$$1\frac{9}{8} = 1 + 1\frac{1}{8} = 2\frac{1}{8}$$

4. Reduce!

Model with Fraction Bars:



Model with a Number Line:



Reducing Fractions

$$\frac{24}{36} = \frac{2}{3}$$

1. Find the GCF (greatest common factor) of the numerator + denom.

$$\text{GCF} = 12$$

2. Divide the numerator + denominator by the GCF.

1	24
2	12
3	8
4	6

1	36
2	18
3	12
4	9
6	6

$$\frac{24 \div 12}{36 \div 12} = \frac{2}{3}$$

simplest form!

Converting Fractions

Mixed # $\rightarrow$ Improper Fraction

$$4\frac{2}{3} = \frac{14}{3}$$

swoop!

1. Multiply the denom. by the whole # + add the num.

2. Keep the denominator.

Improper Fraction $\rightarrow$ Mixed #

$$\frac{25}{6} = 4\frac{1}{6}$$

divide!

1. Divide.
2. Numerator is Remainder.
3. Keep denom.

Equivalent Fractions

Equivalent means **EQUAL**

★ Multiply the numerator AND denominator by the same #- whatever you do to the bottom, you also do to the top!

$$\frac{1}{2} \xrightarrow{\times 4} \frac{4}{8}$$



★ Only change 1 fraction when finding common denominators because they are RELATED!

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

$$\frac{1}{3} = \frac{2}{6} = \frac{4}{12}$$

$$\frac{1}{5} = \frac{2}{10} = \frac{20}{100}$$

Subtracting Fractions

1. Find a common denominator (if they are unlike).

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

$$-\frac{1}{2} \xrightarrow{\times 2} -\frac{2}{4}$$

2. Subtract the numerators + any whole #s

$$\begin{array}{r} 1\frac{3}{4} \\ - 1\frac{2}{4} \\ \hline \end{array}$$

(Regroup if needed).

★ Borrow from the whole # + add 1 whole to the fraction!

3. Keep the **NEW** denominator.

$$2\frac{1}{6} = 2\frac{1}{6} + \frac{6}{6} = 2\frac{7}{6}$$

$$-\frac{1}{3} \xrightarrow{\times 2} -\frac{2}{6}$$

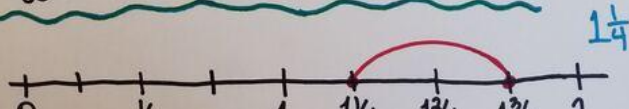
$$\begin{array}{r} 2\frac{7}{6} \\ - 1\frac{2}{6} \\ \hline 1\frac{5}{6} \end{array}$$

4. Reduce!

Model with Fraction Bars:



Model with a Number Line:



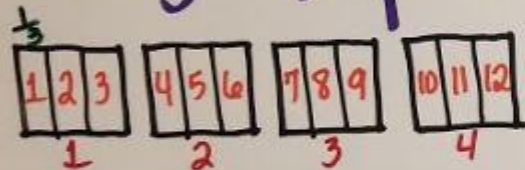
Keep
Change
Flip

Dividing Fractions

Multiply
by the
reciprocal!

Whole # $\div$ Fraction

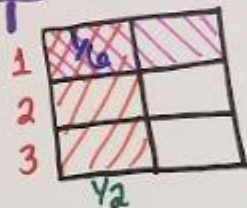
$$4 \div \frac{1}{3} = 4 \times \frac{3}{1} = 12$$



★ There are 12 $\frac{1}{3}$ pieces in 4 wholes!

Fraction $\div$ Whole #

$$\frac{1}{2} \div 3 = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$$



★ $\frac{1}{2}$ split into 3 pieces is $\frac{1}{6}$!

★ If the answer should be a whole #, then the equation starts with a whole #.

★ If the answer should be a fraction, then the equation starts with a fraction.

What are you splitting up/sharing? Split between

Fractions as Division

★ Fractions SHOW Division!

★ $\div$ equals a fraction bar!

Split between

How much of a pizza will each person get if 5 people share 3 pizzas?

Split 3 between 5

$$3 \div 5 = \boxed{\frac{3}{5}} \text{ of a pizza}$$

How many cookies will each person get if 4 people are sharing 11 cookies?

Split 11 between 4

$$11 \div 4 = \frac{11}{4} = \boxed{2\frac{3}{4}} \text{ cookies}$$

Multiplying Fractions

★ Start by turning ALL #s into fractions: $4 = \frac{4}{1}$ $2\frac{1}{3} = \frac{7}{3}$

★ Then, just Multiply straight across!

$$\frac{4}{1} \times \frac{7}{3} = \frac{28}{3} = 9\frac{1}{3}$$

$$\begin{array}{r} 9 \\ 3 \overline{)28} \\ \underline{-27} \\ 1 \end{array}$$

★ Fraction OF a # = Multiply!!

★ I have 18 marbles + share $\frac{1}{3}$ of them. How many did I share?

$$\frac{1}{3} \text{ of } 18 = \frac{1}{3} \times \frac{18}{1} = \frac{18}{3} = 6 \text{ marbles}$$

Numerical Patterns

★ Rules for a set of numbers that are ALWAYS shown in TABLES!

Week(x)	Books(y)		Input(x)	Output(y)
+3	1	+2	1	4
+3	4	+1	2	8
+3	7	+2	3	12
+3	10	+1	4	16
+3	13		5	20

Rule: +3 Rule: +2
 +1

★ Be sure to check the rule on ALL the numbers! (it might change)

Rule: $y = x \cdot 4$

★ Sometimes, $x + y$ have separate rules that are NOT related.

★ Sometimes, $x \cdot y$ are related when you use x + the rule to get y .

★ You can turn the tables into coordinate grids by graphing the ordered pairs.

★ Continue the patterns to MAKE PREDICTIONS about future data!!

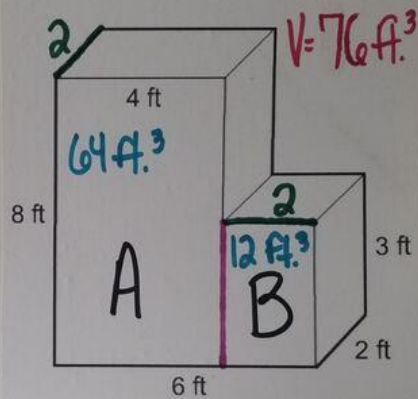
Additive Volume

1. Split into 2 rectangular prisms (boxes).

2. Determine missing #s.

3. Find volume of the 2 prisms.

4. Add the volumes together.



• Volume of A = $\frac{8 \times 4 \times 2}{32 \times 2} = 64$

• Volume of B = $\frac{2 \times 3 \times 2}{6 \times 2} = 12$

$V = 64 + 12 = \underline{76 \text{ ft}^3}$

Order of Operations

P - Parentheses

$$4 + \underline{(9-3)} \div 2$$

E - Exponents

$$4 + \underline{6} \div 2$$

MD - Multiplication + Division
(left $\rightarrow$ right)

$$\underline{4+3} = 7$$

AS - Addition + Subtraction
(left $\rightarrow$ right)

Volume

* # of cubes in object.

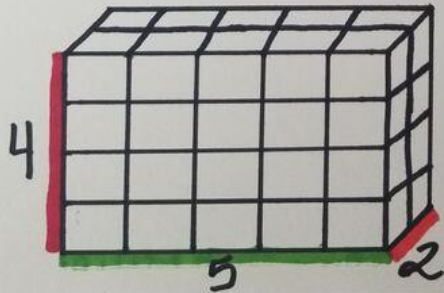
* The amount of space a 3-D object takes up.

Volume = length × width × height
(back) (across) (high)

$$V = A \times h$$

$$V = l \times w \times h$$

$$\text{Area} = l \times w$$



$$V = 2 \times 5 \times 4$$

$$10 \times 4$$

$$V = 40 \text{ units}^3$$

Comparing/Ordering Decimals

1. Line up your numbers VERTICALLY by the decimal point.

\$. 0 8 0	1
\$. 8 0 1	3
\$. 0 8 9	2

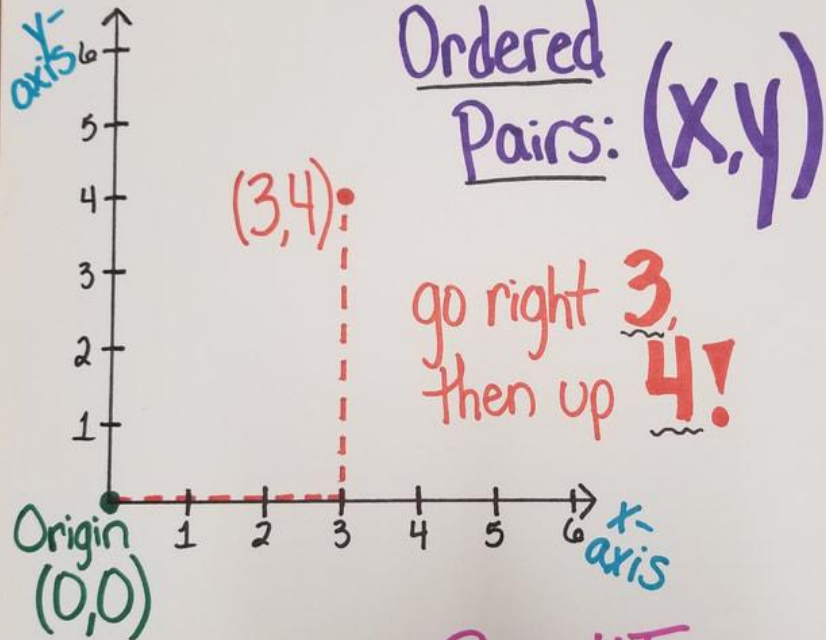
2. Add zeros until ALL #s have the same decimal places. least to greatest:

3.08 3.089 3.801

3. Compare each digit in the same place value from LEFT to RIGHT & mark out places with the same value.

4. The first digit that shows the greater value shows the greater number.

Coordinate Grids



★ If you study **RIGHT**, your grades will go **UP** (go right, then up when plotting a point)!

Customary Measurement

Length

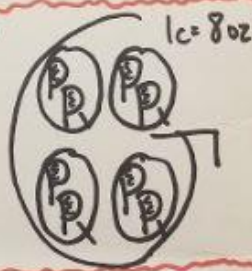
1 ft. = 12 in.
1 yd. = 3 ft.
1 yd. = 36 in.
1 mi. = 1,760 yd.

Capacity

"The Big G"
1 c. = 8 oz.
1 p. = 2 c.
1 q. = 2 p.
1 g. = 4 q.

Weight

1 lb. = 16 oz.
1 T. = 2,000 lb.



Time

1 min. = 60 sec.
1 hr. = 60 min.
1 day = 24 hr.

★ **Horse to Fly, Multiply**
(bigger unit → smaller unit)

★ **Fly to Horse, Divide of Course**
(smaller unit → bigger unit)

Standard Algorithm

Division Strategies

Big-7

$$1,674 \div 12 = 139 \text{ r } 6$$

$$\begin{array}{r} \times 139 \text{ r } 6 \\ 12 \overline{) 1674} \\ \underline{-12} \\ 47 \\ \underline{-36} \\ 194 \\ \underline{-108} \\ 6 \end{array}$$

dividend
divisor

quotient

Steps:

1. Dad = Divide
2. Mom = Multiply
3. Sister = Subtract
4. Brother = Bring Down
5. Rover = Repeat or Remainder

Easy Numbers

$$\begin{aligned} \times 1 &= 12 \\ \times 2 &= 24 \\ \times 5 &= 60 \end{aligned}$$

don't forget the remainder!

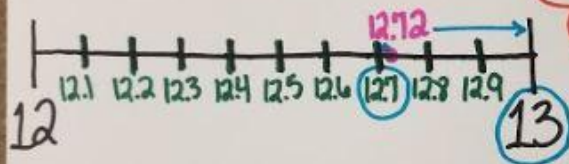
$$\begin{array}{r} 139 \text{ r } 6 \\ 12 \overline{) 1674} \\ \underline{-1200} \\ 474 \\ \underline{-240} \\ 234 \\ \underline{-120} \\ 914 \\ \underline{-60} \\ 454 \\ \underline{-48} \\ 6 \end{array}$$

$\times 100$
 $\times 20$
 $\times 10$
 $\times 5$
 $\times 4$

$\begin{array}{r} 100 \\ 20 \\ 10 \\ 5 \\ + 4 \\ \hline 139 \end{array}$

Estimating Decimals

★ Create a Number Line:



Round
12.72

★ Label the number line by tenths.

Tenths: 12.7

★ Locate the number on the number line.

Ones/
Whole #: 13

★ What is it closest to?

★ When it's 5 or more, you round up!!