ratio: Ratio is a comparison of two quantities or measures. Ratios can be expressed in the form ($\frac{a}{b}$), a to b, or a:b.

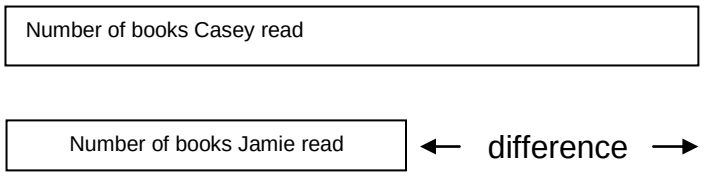
Ratios can be expressed as comparisons of:

1. part to a whole, one part of a whole to another part of the same whole. Part-to-whole would be the ratio of boys to the whole class. measures of two different types which is called a rate.
2. part-to-part would be the ratio of boys to girls in a class.

Measures of two different types are called a rate. Rate would be the ratio of miles per gallon to miles per hour.

unit rate: A ratio where the denominator is 1 unit. Example: If 15 bars of soap cost $6.75,one bar would cost $.45. $\frac{6.75}{15} = \frac{.45}{1}$

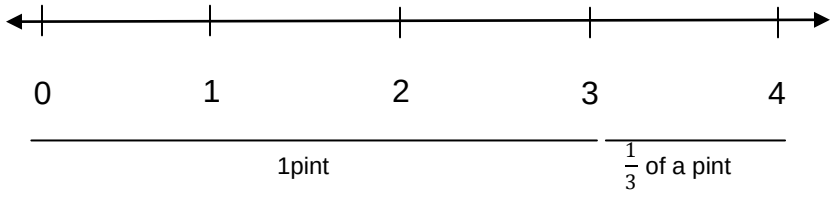
tape diagrams: Tape diagrams are linear models used to represent data and help students organize their thinking. Example: Casey read 7 more books than Jamie. If Casey has read 16 books, how many books did Jamie read?



Jamie + 7 = Casey
Casey – 7 = Jamie
16 – 7 = 9
So Jamie read 9 books.

percent: is another name for hundredths Ratio of a number to 100 with a percent sign. Per hundred Example: 75% = $\frac{75}{100}$ = .75

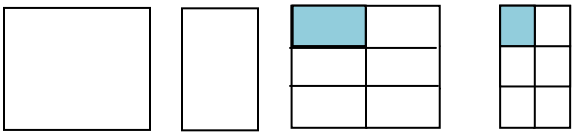
measurement concept: This is referring to division of fractions. Reviewing,4 ÷ 3 with this concept means, "How many sets of 3 are in 4?" If you have 4 pints of ice cream to divide among 3 people, how much does each person receive?



Therefore each person gets $1\frac{1}{3}$ pints of ice cream.

Partition concept: Modeling a quotient, using the partitive concept, requires that only the dividend be modeled. The divisor represents the number of equal parts into which the dividend is to be partitioned. Thus, the modeling materials representing the dividend are rearranged, partitioned, or sub-divided into equal groups. The quotient is the number shown in each of the equal groups. Due to the very nature of the partitive concept, the divisor of a quotient must be a whole number ≥ 2.

$1\frac{1}{2} \div 6$



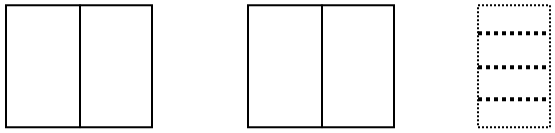
So $1\frac{1}{2}$ can be divided into 6 equal groups by dividing each part in 6 equal pieces. Take 1/6 of each part and add those together.

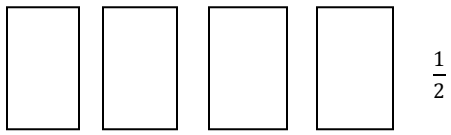
$\frac{1}{6} + \frac{1}{12} = \frac{2}{12} + \frac{1}{12} = \frac{3}{12} = \frac{1}{4}$

Each group is equal to $\frac{1}{4}$.

If, after some of the materials are rearranged into equal groups, there are materials remaining, the remaining materials should be traded for equivalent smaller pieces and the partitioning continued. If a number, less than the divisor, of the smallest pieces in your model remain after the partitioning has been completed, a fraction may be expressed where the remainder (the remaining number of smallest pieces) is the numerator and the divisor is the denominator. The quotient is the number in each equal set plus this fraction.

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





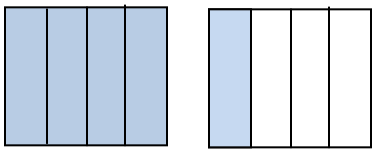
$\frac{1}{2}$

$\frac{1}{8}$

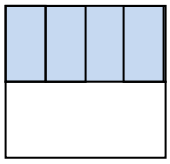
$\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$

So each group of 4 contains a part equal to $\frac{5}{8}$.

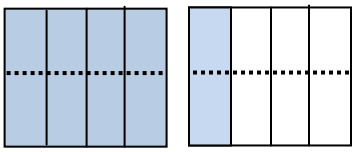
common denominator algorithm: The common-denominator algorithm is repeated subtraction concept of division. Example : $\frac{5}{4} \div \frac{1}{2}$



$= \frac{5}{4}$

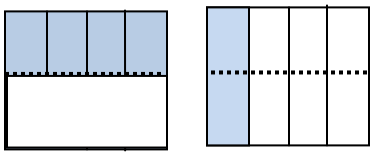


the blue represents one set of $\frac{1}{2}$

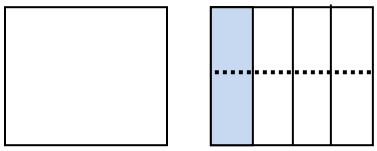


divide in half

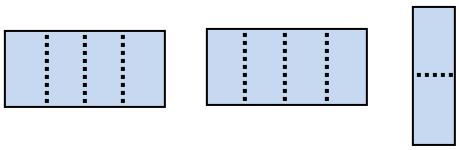
subtract $\frac{1}{2}$



subtract the second $\frac{1}{2}$



Now we have 2 wholes. The blue that is left is 2 parts out of 4 parts (the original one-half divided into 4 parts…see drawing above) which equals 2 out of 4 or $\frac{1}{2}$.



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

standard algorithm: An algorithm is a systematic scheme for performing computations, consisting of a set of rules or steps.

greatest common factor: (GCF) The largest number that will divide two or more numbers exactly. It is sometimes called greatest common divisor. One way to find the GCF of 9, 12, and 15 is to list the factors of each number.

9 is 1,3,9
12 is 1,2,3,4,6,12
15 is 1,3,5,15

The GCF is 3 because it is the largest factor they all have in common.

least common multiple: (LCM) The smallest number that is the multiple of two or more other numbers. One way to find the LCM of 3,4,and 6 is to list the multiples of each number.

3 is 3,6,9,12,15
4 is 4,8,12,16,20,
6 is 6,12,18,24,30

The LCM is 12 because it is the smallest multiple they all have in common.

distributive property: The property of distributing one operation over another and the answer is the same.

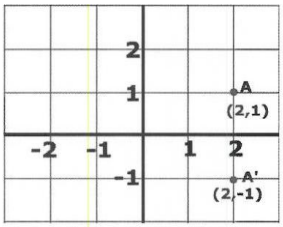
Distributive Property of Multiplication over Addition

$a(b + c) = ab + ac$
$2(5 + 1) = 2\times5 + 2\times1$
$2(6) = 10 + 2$
$12 = 12$

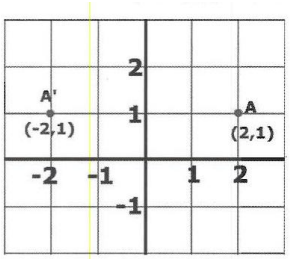
Distributive Property of Multiplication over Subtraction

$a(b – c) = ab – ac$
$2(5 – 1) = 2\times5 - 2\times1$
$2(4) = 10 - 2$
$8 = 8$

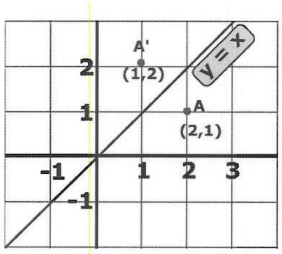
reflections: a mirror image that is sometimes called a flip. It is a transformation or rigid motions that do not change the size or shape of the object being moved. An example in the coordinate plane is:



reflection across the x-axis



reflection across the y-axis



reflection across a given line, y = x

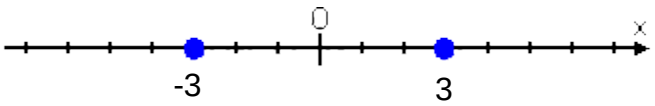
integers: A whole number and their opposites. Integers do not include fractions or decimals. Zero is not considered to be negative or positive. The positive sign is not always written with its number but the negative sign must always be there.

Example: 2 and -2, 10 and -10, 82 and -82 -5, -4, -3, -2, -1, 0, 1, 2, 3, 4,5

rational numbers: A rational number is a number that can be in the form $\frac{\mathbf{p}}{\mathbf{q}}$ where **p** and **q** are integers and **q** is not equal to zero.

Example: $\frac{1}{3}$ $\frac{-7}{2}$ $\frac{4}{1}$ $\frac{6}{-17}$

absolute value: the absolute value of a number as its distance from zero The absolute value of *x*, denoted "| *x* |" (and which is read as "the absolute value of *x*"), is the distance of *x* from zero. This is why absolute value is never negative; absolute value only asks "how far?", not "in which direction?" This means not only that | 3 | = 3, because 3 is three units to the right of zero, but also that | –3 | = 3, because –3 is three units to the left of zero.



properties of equality: Rules which allow you to balance, manipulate, and solve equations.

Reflexive property: x = x
Example: 2 = 2 or I am equal to myself

Symetric property: If x = y, then y = x
Example: Suppose fish = tuna, then tuna = fish

transitive property: If x = y and y = z, then x = z
Example: Suppose John's height = Mary's height and Mary's height = Peter's height, then John's height = Peter's height

Addition property: If x = y, then x + z = y + z
Example: Suppose John's height = Mary's height, then John's height + 2 = Mary's height + 2
Or suppose 5 = 5, then 5 + 3 = 5 + 3

Subtraction property: If x = y, then x − z = y – z
Example: Suppose John's height = Mary's height, then John's height − 5 = Mary's height − 5
Or suppose 8 = 8, then 8 − 3 = 8 − 3

Multiplication property: If x = y, then x × z = y × z
Example: Suppose Jetser's weight = Darline's weight, then Jetser's weight × 4 = Darline's weight × 4
Or suppose 10 = 10, then 10 × 10 = 10 × 10

Division property: If x = y, then x ÷ z = y ÷ z
Example: Suppose Jetser's weight = Darline's weight, then Jetser's weight ÷ 4 = Darline's weight ÷ 4
Or suppose 20 = 20, then 20 ÷ 10 = 20 ÷ 10

Substitution property: If x = y, then y can be substituted for x in any expression
Example: x = 2 and x + 5 = 7, then 2 can be substituted in x + 5 = 7 to obtain 2 + 5 = 7

dependent variable: In a function of two variables, one variable is dependent and the other is independent. In the equation $y = 3x + 4$, y is the dependent variable. Its value depends on the value of x. If the value of $x = 2$, then the value of y is $y = 3\times2 + 4$ or $y = 10$.

independent variable: In a function of two variables, one variables is dependent and the other independent. In the equation $y = 3x + 4$, x is the independent variable. The value of y depends on the value of x. If the value of x is 1, then the value of y is $y = 3\times1 + 4$ or $y = 7$.

variability: It is the ability to change or alter. In data, it will change or vary according to the situation.

statistical question: A question that is asked about a group of data.

distribution: To divide, share, or spread data in order to answer a statistical question. Distribution can be described by its center (mean or median), spread (range) and overall shape (curve).

outliers: A piece of data that seems to be too far out at one end of the range is called an outlier. Outliers can affect how you interpret your data.

measure of center: The mean and median are the measure of center for numerical data. They summarize the data into one number.

measure of variation: The range is the distance between the highest and lowest data values.

dot plots: It is sometimes called a line plot. A set of data is represented by using dots on a number line.

histograms: is a form of bar graph in which the categories are consecutive equal intervals along a numerical scale. The height of each bar is determined by the number of data pieces that fall into that particular interval. Students have to be careful about using the appropriate interval for each bar width and a good scale for the height of the bars.

box plots: It is sometimes called a box-and-whisker plot. It displays the data on a number line in such a way you can see the median, the quartiles and outliers of a set of data. It does not display any other specific values in a set of data.

interquartile range: is the distance between the 75^{th} percentile and the 25^{th} percentile on a box plot. The interquartile range is the range of the middle 50% of the data.

mean absolute deviation: it describes the average distance from the mean for the numbers in the data set. First you find the mean of the set of data. Then you subtract the mean from each data point and find the absolute value. Get the mean of your answers and that is your mean absolute deviation.

deviations: something that departs from the norm or standard

variability: "the state or characteristic of being variable" describes how spread or closely clustered a set of data is. Variability measures such things as the range, standard deviation and variance.