GRADE 5 MATH – CONTENT SUMMARY

(2023 STANDARDS)

5.NS.1 EQUIVALENT FRACTIONS AND DECIMALS; ORDERING LEAST TO GREATEST

Represent fractions with denominators of 3, 8 or factors of 100 as decimals: $\frac{3}{5} = \frac{6}{10}$ or 0.6

Some fractions equal **repeating decimals**: $\frac{2}{3}$ = 0.666… or $0.\overline{6}$

Note that repeating decimals can be written with a **line over** the repeating digit or with an **ellipsis** (three dots).

Proper fraction – numerator less that denominator - 1/2 , 7/8

Improper fraction – numerator equal or greater than denominator – 12/7, 4/4.

Improper fractions can be written as **mixed numbers** - $3\frac{5}{8}$, $2\frac{1}{4}$

Use the **symbols >, <, =, and ≠ to compare decimals** through thousandths, fractions (proper or improper fractions), and/or mixed numbers, having denominators of 12 or less.

Put the following in order from **least to greatest**: 1/2, 0.3, 3/8, 0.7

Answer: 0.3, 3/8, ½, 0.7

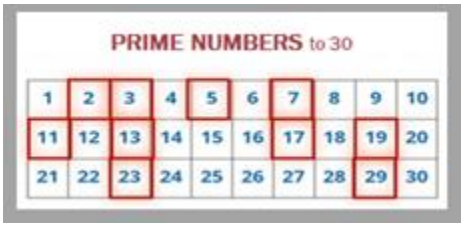
5.NS.2 PRIME AND COMPOSITE NUMBERS

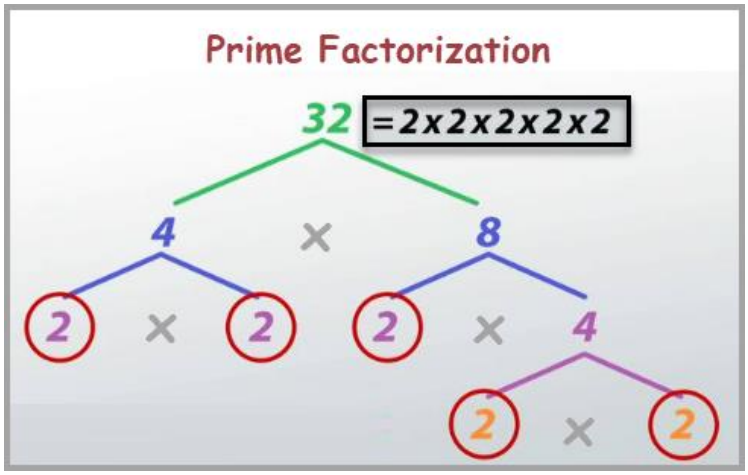
A ***prime number*** is a number other than one that has **exactly two different factors,** one and the number itself.

Other numbers are **composite** numbers. The number 1 is neither prime nor composite.

Prime factorization of a number – represent a number as the product of prime numbers.

What is the prime factorization of 24? 2 x 2 x 2 x 2 of 9? 2 x 3





5.CE.1 ADDITION, SUBTRACTION, MULTIPLICATION, AND DIVISION OF WHOLE NUMBERS

In doing word problems, focus on what **makes sense** rather than on key words like "in all" which can be misleading.

There are many problem types (numerous examples are given in this standard).

Problem 25 x 96 = 2,400 can be presented a number of ways.

25 boxes of crayons and each box contains 96 crayons, how many in all?
There are 2,400 crayons, evenly split into 25 boxes. How many crayons per box?
There are 2,400 crayons. With 96 per box, how many boxes are there?

Division problems can the treat **remainder** differently.

Some require **discarding** the remainder (splitting 9 pencils among 2 friends)
Some require **splitting** the remainder (3 friends share 2 candy bars)
Some require **rounding up** (how many cars needed for 6 people)
Some require **rounding** (with a bag of 29 candies, about how many pieces will each of the six children get)

Familiarity with **properties** (don't need to know names) can help solve problems.

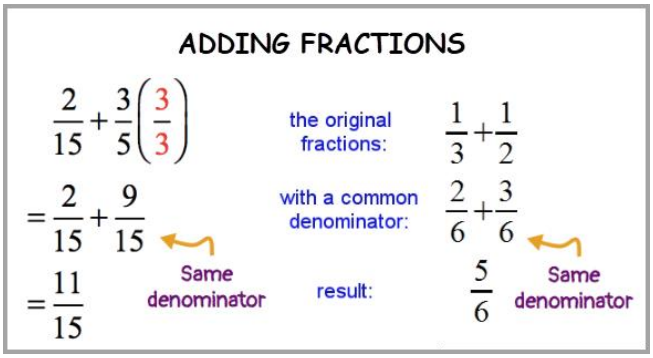
- **Commutative** property of **addition**: a + b = b + a

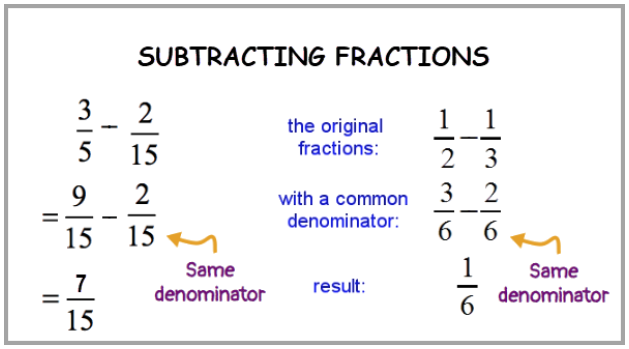
- **Commutative** property of **multiplication**: $a \cdot b = b \cdot a$
- **Associative** property of **addition**: $(a + b) + c = a + (b + c)$
- **Associative** property of **multiplication**: $(ab)c = a(bc)$
- **Distributive** property (over addition/subtraction): $a(b + c) = ab + ac$ and $a(b - c) = ab - ac$

Example of **distributive property**: **3(15)** = 3(5 + 10) = (3 x 5) + (3 x 10) = 15 + 30 = 45

9 x 13 = 9(10 + 3) = (9 x 10) + (9 x 3) = 90 + 27 = 117

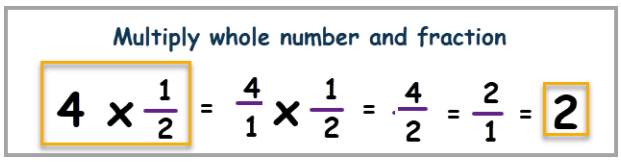
5.CE.2 COMPUTING WITH FRACTIONS





Fractions in **simplest form**: divide numerator and denominator by **greatest common factor**

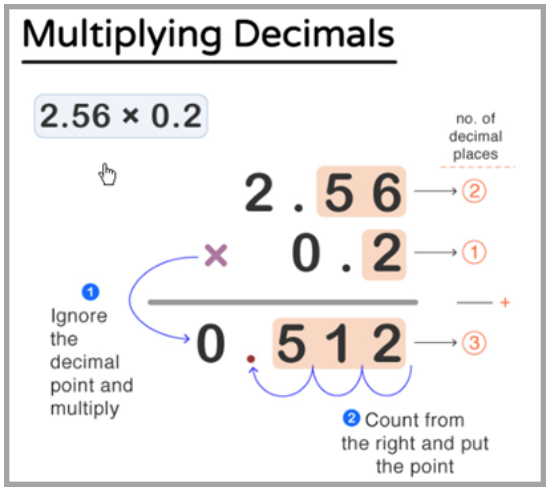
Example: 3/15 (divide numerator and denominator by 3) = 1/5 in simplest form

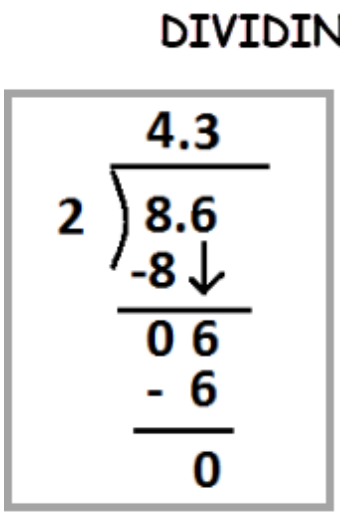


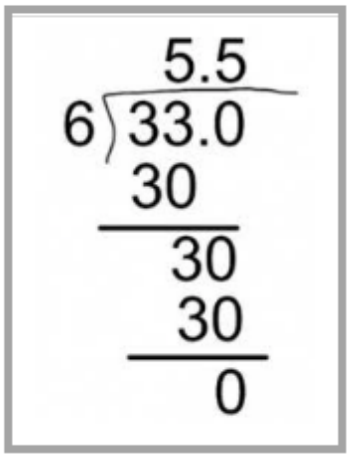
5.CE.3 COMPUTING WITH DECIMALS

Terms used in division are **dividend ÷ divisor = quotient** or

$$\text{divisor}\overline{)\,\text{dividend}}^{\,\text{quotient}} \qquad \frac{\text{dividend}}{\text{divisor}} = \text{quotient}$$







5.CE.4 ORDER OF OPERATIONS

Order of operation – **PEMDAS**

P - parenthesis ();

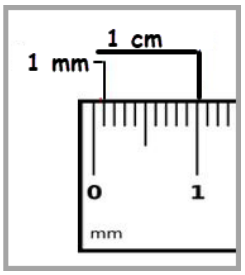
E – exponents

MD – **multiply** and/or **divide**, **left to right**

AS – **add** and/or **subtract**, left to right

Example: **12 – 2 x 5 = 2** but **(12 – 2) x 5 = 50**

5.MG.1 METRIC UNITS FOR LENGTH, MASS AND LIQUID VOLUME



Measuring Length – kilometer (you might walk one in 10 minutes) = **1000 meters**

meter (approx. width of a door) = **100 centimeters** or **1000 millimeters**

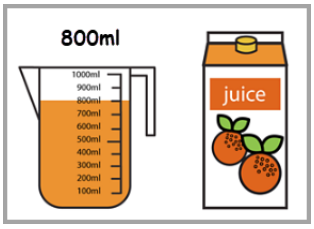
centimeter (approx.. length of a fingernail) = **10 millimeters**

millimeter (the length of a dash -)

Measuring Weight and Mass –

Mass is the **amount of matter** in an object.

Kilogram (a book might be 1 kilogram (kl) = **1000 grams**



Gram (a paperclip might be 1 gram)

Weight – accounts for **pull of gravity** on an object , so on the moon with less gravity, weight and mass will differ, but on Earth the terms often mean the same thing.

Volume (of liquid) –

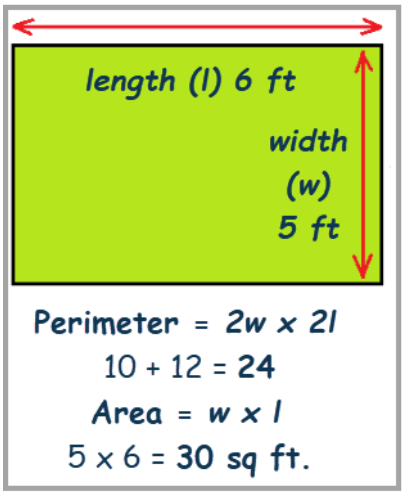
Liter (you might drink a ½ liter of cola) = **1000 milliliters**

Milliliter (ml) about 20 drops

Questions: How many **meters** in **8 kilometers?** Answer: 8,000

If a paperclip weighs a **gram**, how many paperclips in a box that weighs a **kilogram**. Answer: 1000

If you walked **½ kilometer,** how many meters did you walk? Answer: 500



5.MG.2 PERIMETER, AREA, VOLUME

Perimeter – distance around a two-dimensional (plane) figure

2 x *length* + 2 x *width*

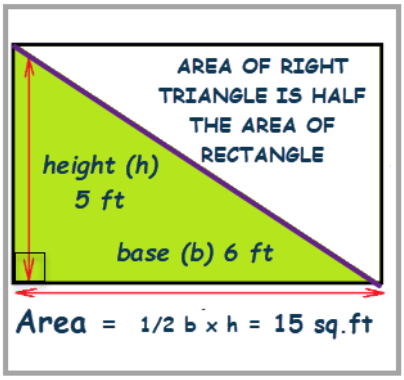
Area – Number of square units needed to cover the a surface or plane figure

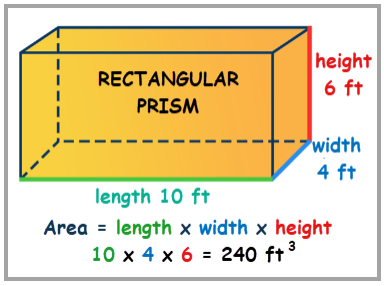
length x width

Area of right triangle – half the area of rectangle

note that two sides are of right angle are called **base** and **height**

Area = ½ base x height



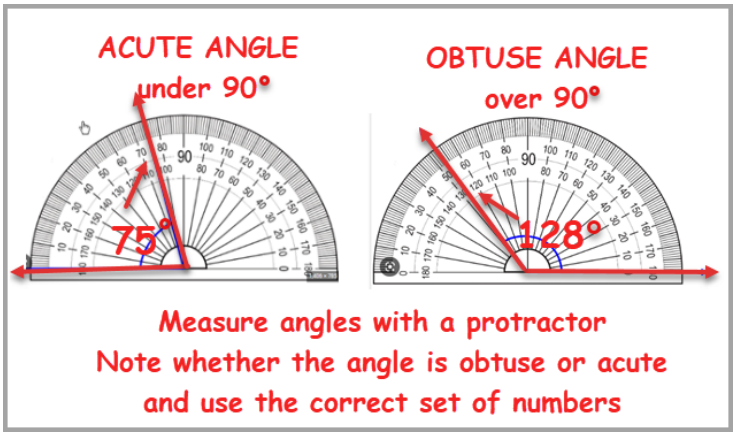


Volume of a three-dimensional figure like a rectangular prism

length x ***width*** x ***height***

measured in ***cubic units*** *like* ft^3

5.MG.3 RIGHT, ACUTE, OBTUSE, AND STRAIGHT ANGLES



Angles are measured in **degrees**. . There are **360 degrees** in a circle.

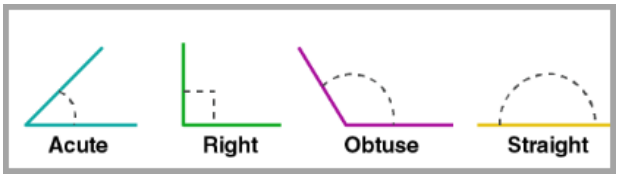
A **right angle** measures exactly **90 degrees**

An **acute angle** 0 - 90 degrees.

An **obtuse angle**: 90 – 180 degrees

A **straight**

A **right** **triangle** has one **right angle**.



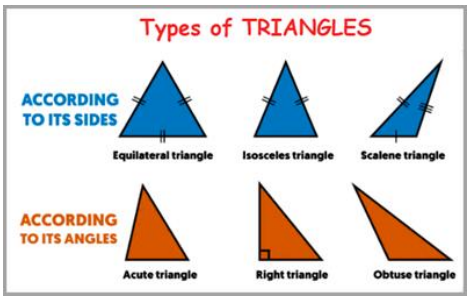
An **obtuse triangle** has **one obtuse** angle.

An **acute triangle** has **three acute** angles.

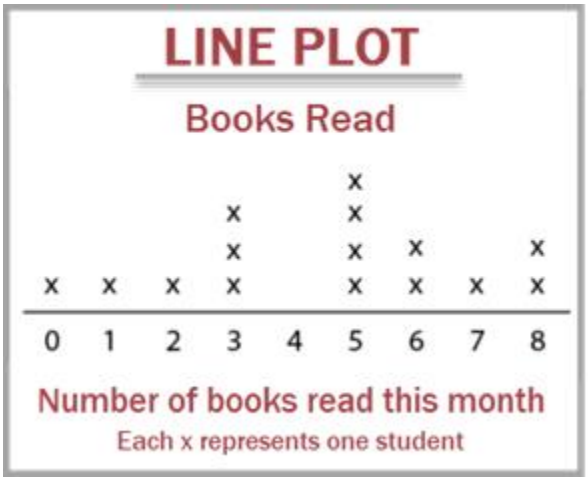
A **scalene triangle** has **no congruent sides**.

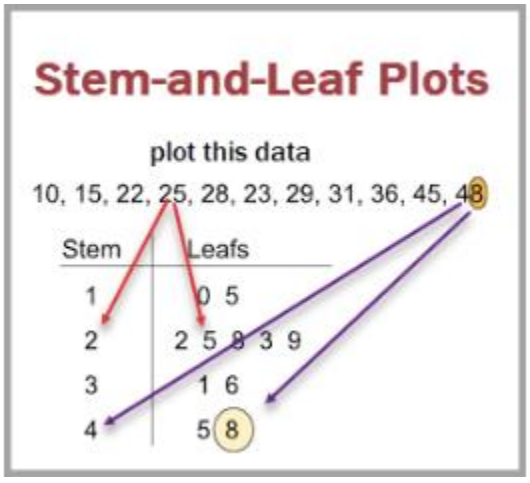
An **isosceles triangle** has at least **two congruent sides**.

An **equilateral triangle** has **three congruent sides**. All angles of an equilateral triangle are congruent and measure 60 degrees.



5.PS.1 PLOTTING DATA – LINE PLOTS AND STEM-AND-LEAF PLOTS





Different data requires **different types of graphs**.

In the above Line Plot, how many students read 5 books? Answer – 4

In the above stem-and-leaf plot, how many numbers over 40 are plotted? Answer – 2 (45, 48)

5.PS.2 MEAN, MEDIAN, MODE AND RANGE

Mean, median and **mode** can be considered as **measure of center,** or middle of a data set, or they can be seen as **types of averages**.

Mean represents **FAIR SHARE,** and is often referred to this way.

Find the mean by **adding all the data points** and then **dividing** by the **number** of data points.

What is the **mean** or **fair share** of (2, 6, 9, 3) ? Answer – **5** Why? 2 + 6 + 9 + 3 = 20. 20 / 4 = **5**

Median – the **middle value** of an ordered data set.

If there is an **odd number** of data points, the median is the **middle value.**

If the is an **even number** of data points, the median is the arithmetic average (**mean**) of the **two middle values**.

Mode – piece of data that occurs **most often**.

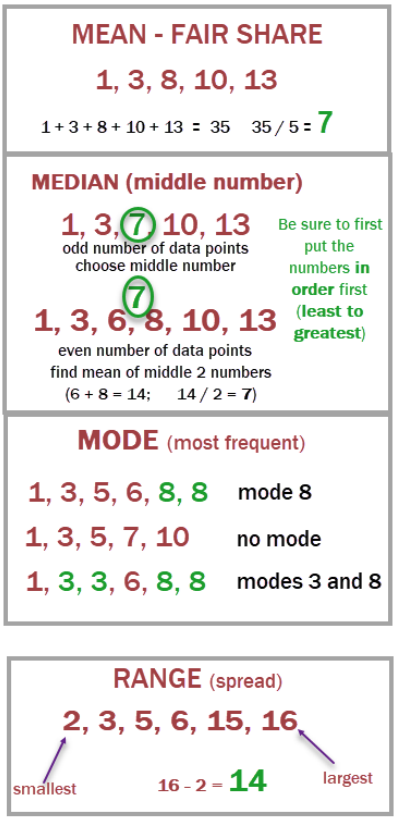
There may be **no mode** if each piece of data occurs only once. Or there could be **more than one mode** as in this case (1, 3, 3, 5, 5, 7, 8, 9) where there are two modes, 3 and 5.

Range – the **spread** of the data

the distance between the **greatest and smallest values**

subtract the **smallest** from the **largest** number

(2, 8, 11) Range is 9 (11 – 2 = 9)



5.PS.3 PROBABILITY AND THE FUNDAMENTAL COUNTING PRINCPLE

Probability is the measure of **likelihood** that an event will occur.

The probability of an event can be expressed as a **fraction**, where the **numerator** represents the number of **favorable outcomes**, and the **denominator** represents the total number of **possible outcomes.**

$$\text{Probability of event} = \frac{\text{number of favorable outcomes}}{\text{total number of possible outcomes}}$$

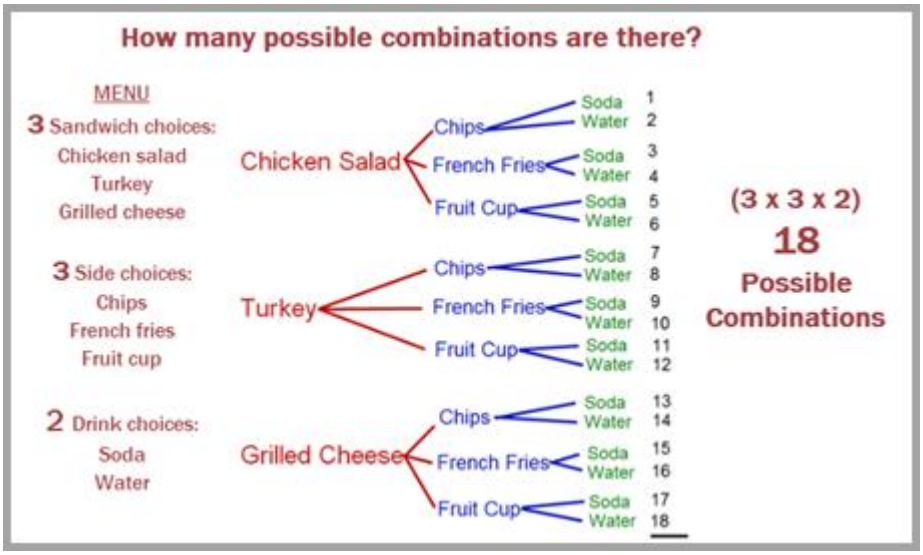
Probability is quantified as a number between **zero and one**.

Zero means "**impossible**". **One** means "**certain".**

If a bag has 4 candies, and 3 are red, the probability of blindly choosing a red candy is ¾. The probability of choosing a candy that is not red is ¼.

The **fundamental counting principle** is a rule used to count the total number of **possible outcomes** in a situation.

How many different outfit combinations can be made of 2 shirts and 3 pants.



Answer: 2 x 3 = 6

What if we added socks. How many combinations can be made of 2 shirts, 3 pants and 4 pairs of socks.

Answer: 2 x 3 x 4 = 24

What is the probability that someone will choose a turkey sandwich with French fries and a soda?

Answer: 1/18

5.PFA.1 PATTERNS

Patterns at this level may include addition, subtraction, or multiplication, or division. What comes next in each of these patterns?

2, 4, 8, 16, … Answer 32

32, 30, 28, 26, … Answer 24

1, 2, 4, 7, 11, 16, … Answer 22

Patterns sometime shown as **input-output table**:

What is the rule in this table?

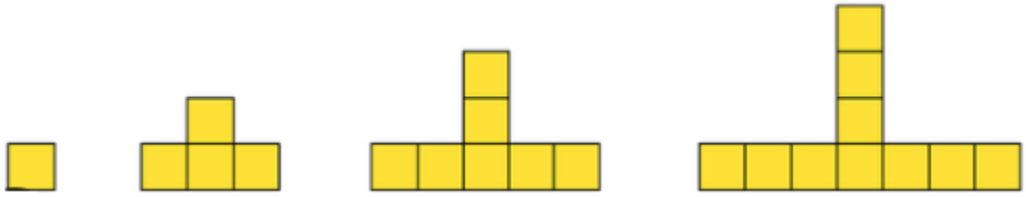
Answer – divide by 5

What is the missing output?

Answer - 3

In	Out
5	1
10	2
15	?
20	4
25	5

How many blocks will make up the next figure in this pattern?



Answer - 13

5.PFA.2 VARIABLES

A **variable** is a **symbol** that can stand for an unknown number

An **expression** represents a quantity but is made of numbers, variables and symbols like +, - ,

"Add 3 to the number" can be represented by the **expression** ***x + 3***

An ***equation*** also uses variables but contains an equal sign - $y + 7 = 10$ ($y = 3$)

Write an equation to represent: "John eats the same number of candies every day. How many candies does John eat a day if he eats 14 in a week.". Using the variable c for the number of candies per day - ***7 • c = 14*** *(c = 2)*

An **open box** like □ can be used instead of a variable 5 + □ = 8