

Math Study Guide: 5th Grade

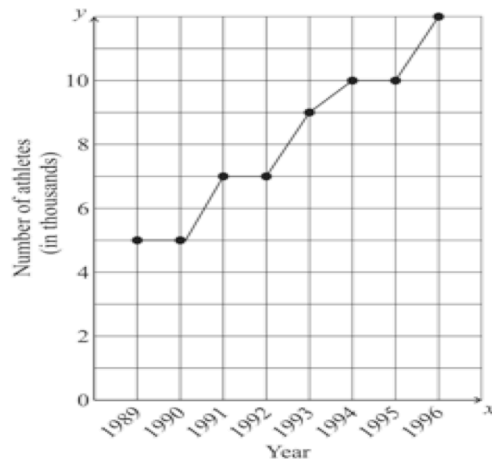
Using symbols for unknown numbers

- ❖ $N \times 8 = ?$
- ❖ $N = 7$
- ❖ $7 \times 8 = 56$

Bar Graph (use to compare things against other things)



Line Graph – (use to compare something over a period of time)



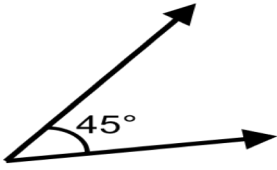
Pictographs – (use when adding pictures to show data)

Week	Number of Flights
Week 1	✈ ✈ ✈ ✈ ✈ ✈ ✈ ✈ ✈ ✈
Week 2	✈ ✈ ✈ ✈ ✈ ✈ ✈
Week 3	✈ ✈ ✈ ✈ ✈
Week 4	✈ ✈ ✈ ✈
Week 5	✈ ✈

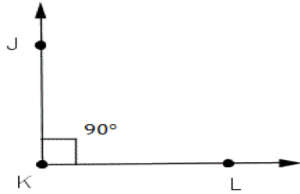
✈ = 5 Flights

Classifying Triangles by their ANGLES

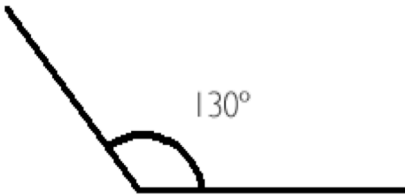
acute triangle - less than 90°



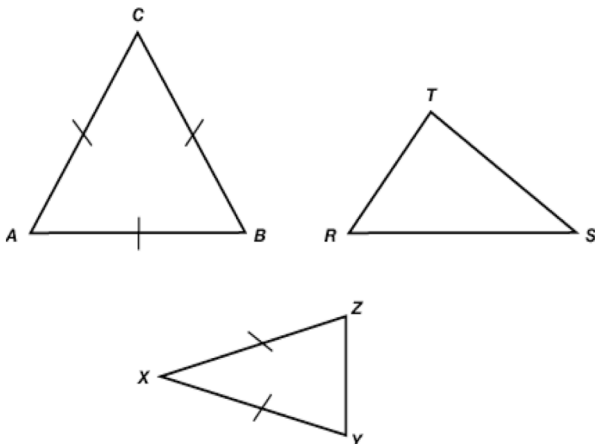
right triangle - 90° (usually has a square in it)



obtuse triangle - over 90°



Classify Triangles by their SIDES



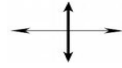
Triangle ABC - equilateral - all sides are equal

Triangle RST - scalene - no sides are equal

Triangle XYZ - isosceles - two sides are equal

❖ **parallel lines** - two lines that run side by side =====

❖ **perpendicular lines** - two lines that intersect making a cross



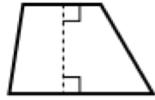
❖ **intersecting lines** - two lines that intersect making an X



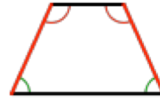
Quadrilaterals



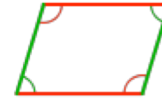
Trapezium
(Amer. Eng.)



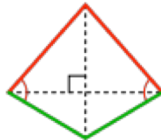
Trapezoid (Amer. Eng.)
Trapezium (Brit. Eng.)



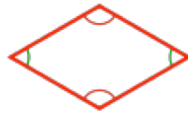
Isosceles trapezoid (Am.)
Isosceles trapezium (Br.)



Parallelogram



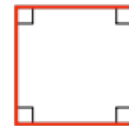
Kite



Rhombus



Rectangle



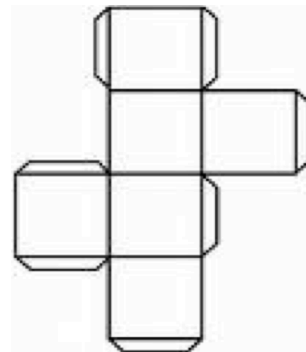
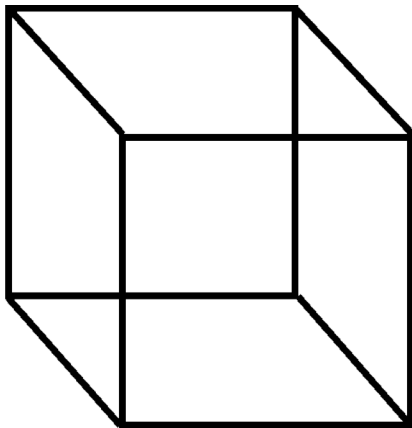
Square

Faces - flat pieces

Edges - lines;

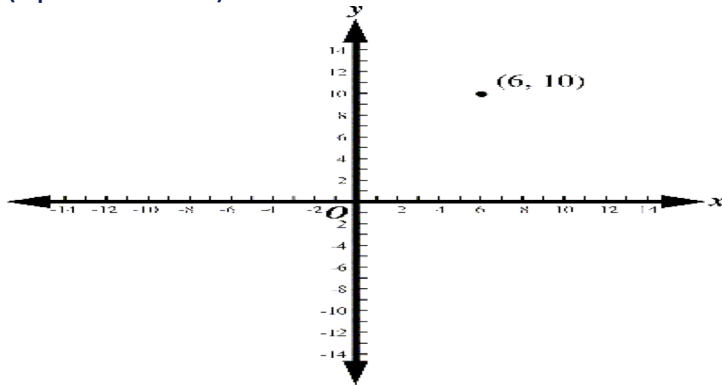
Vertices – corners

LABEL THE CUBE BELOW

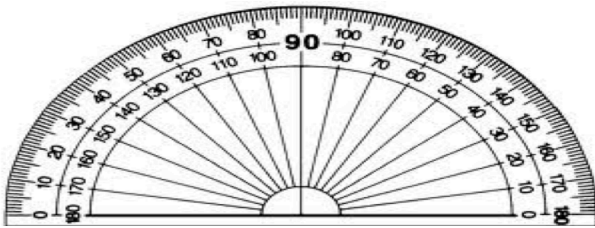


-unfolded cube

Coordinate System - a basketball player DRIBBLES (left to right) first and then (up and down) SHOOTS



Using a protractor - if the angle is bigger than 90', use the bigger numbers to tell the measurement of the angle.

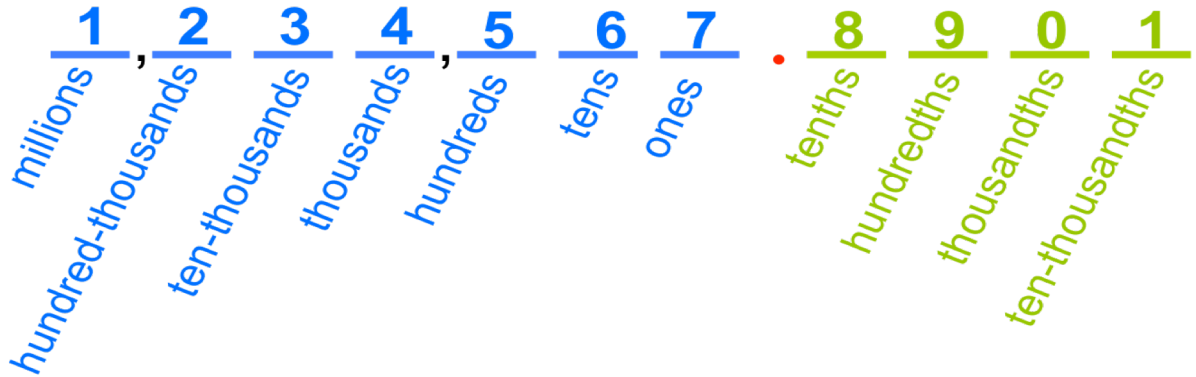


- ❖ Half of a rotation is 180' (1/2 a circle)
- ❖ A full rotation is 360' (a full circle)
- ❖ a 90' rotation is 1/4 - it takes 4(90') to make one circle

Weight - how heavy something is

- ❖ 16 ounces (oz) = 1 pound (lb)
 - 3lbs = 48 oz
 - 33 oz = 2 lbs 1 oz
- ❖ 2,000 lbs = 1 ton (T)
 - 7,000lbs = 3 1/2 T
 - 8 T = 16,000 lbs
- ❖ 1,000 grams (g) = 1 kilogram (kg)
 - 5,500 g = 5 1/2 kg
 - 6 kg = 6,000 g

Place Value



Three ways to describe a number

standard form: 7, 526

word form: seven thousand, five-hundred, twenty-six

expanded form: $7000 + 500 + 20 + 6$

Rounding/estimating numbers

- ❖ If the digit after the one being rounded is less than 5 (0, 1, 2, 3 or 4), we round down.
- ❖ If the digit after the one being rounded is 5 or more (5, 6, 7, 8, or 9), we round up.
 - round to the nearest thousand: $5,633 = 6,000$
 - round to the nearest hundred: $4,311 = 4,300$
 - round to the nearest ten: $7,344 = 7,340$

Multiplication steps for: 628×7

"7 times 8 is 56." Write 6, carry 5.

"7 times 2 is 14, plus 5 is 19." Write 9, carry 1.

"7 times 6 is 42, plus 1 is 43." Write 43

$$\begin{array}{r} 15 \\ 628 \\ \times 7 \\ \hline 4396 \end{array} = 6 \text{ hundreds} + 2 \text{ tens} + 8 \text{ ones}$$
$$\begin{array}{r} \\ \\ 7 \\ \hline 56 \text{ ones} \\ 14 \text{ tens} \\ 42 \text{ hundreds} \\ \hline 4396 \end{array}$$

Division steps for: $1,798/5$

- ❖ Begin, "5 goes into 17 three (3) times (15) with 2 left over."
- ❖ Write 3 over the 7 (not over the 1), and write the remainder 2 next to the 9.
- ❖ Continue: "5 goes into 29 five (5) times (25) with 4 left over."
- ❖ Write 5 over the 9, and write the remainder 4 next to the 8.
- ❖ Finally, "5 goes into 48 nine (9) times (45) with 3 left over."
- ❖ Write 9 over the 8. The final remainder is 3.

$$\begin{array}{r} 359 \text{ R } 3 \\ 5 \overline{)1798} \end{array}$$

$$\begin{array}{r} \text{Quotient} \\ \text{Divisor} \overline{) \text{Dividend}} \end{array}$$

***KNOW THESE

Decimals

- ❖ line up your decimals when adding/subtraction

$$\begin{array}{r} 95.45 \\ 89.82 \\ \hline 185.27 \end{array}$$

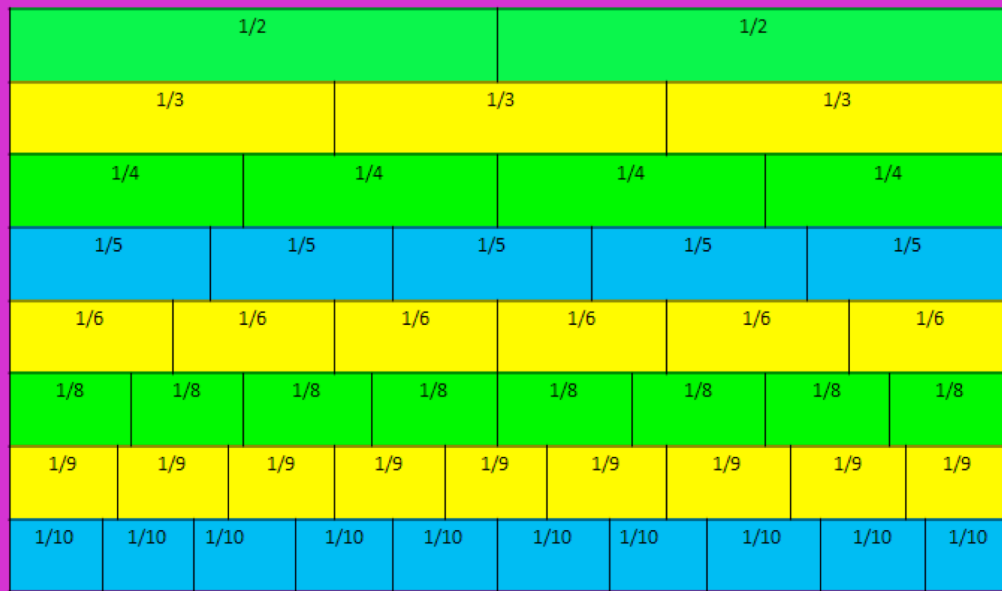
Move the decimal over in the final answer when multiplying/dividing

$$\begin{array}{r} 6.28 \\ \times 25.7 \\ \hline 4396 \\ 3140 \\ 1256 \\ \hline 161.396 \end{array}$$

Fractions

- ❖ equivalent fractions: they equal the same
 - $1/2$ (multiply the top AND bottom by any number - I chose 3)= $3/6$
 - $2/3$ (multiply the top AND bottom by any number - I chose 4)= $8/12$

Equivalent Fractions



Mixed Numbers

The four boys ate
 $2\frac{5}{6}$ pizzas.



Improper Fractions

Larger
(or equal)

Smaller
(or equal)

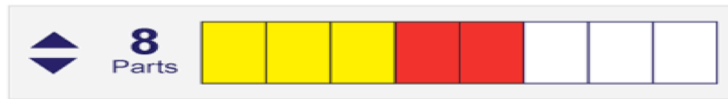
$$\frac{9}{5}$$

$$= 1\frac{4}{5}$$

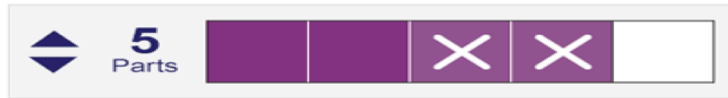
Adding and subtracting fractions

Model the addition or subtraction problem and complete the number sentence.

$$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$$

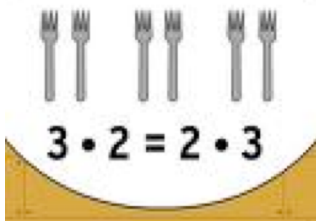


$$\frac{4}{5} - \frac{2}{5} = \frac{2}{5}$$

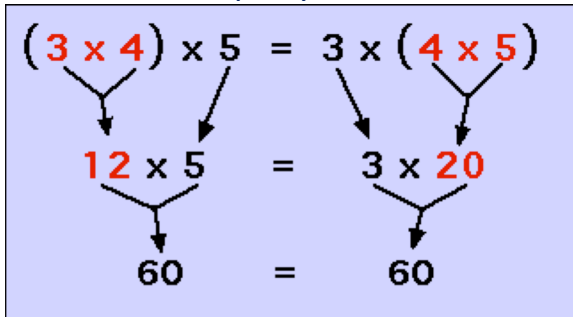


Properties of Math

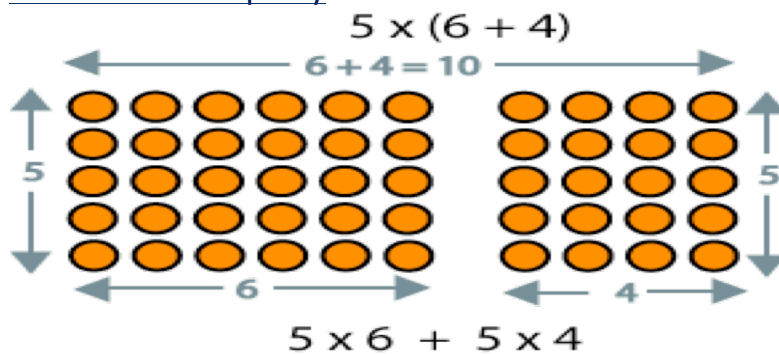
Commutative Property



Associative Property



Distributive Property



Comparing numbers and decimals: <, >, =

- When decimals are compared start with tenths place and move to the hundredths place. If one decimal has a higher number in the tenths place then it is larger than a decimal with a lower number in the tenths column. If each decimal place value is the same then the decimals are equal.
 - $.7 = 7/10 = 70$ cents
 - $.07 = 7/100 = 7$ dollars
 - $.6 > .4$
 - SAME AS $6 > 4$!
 - $.23 < .59$
 - SAME AS $23 < 59$

Multiplying Fractions

Example: Multiply $3/9$ and $4/12$

- 1) Multiply the numerators ($3*4=12$)
- 2) Multiply the denominators ($9*12=108$)
- 3) Place the product of the numerators over the product of the denominators ($12/108$)
- 4) Simplify the Fraction ($6/108 = 1/9$)

Multiplying Mixed Numbers

- 1) Convert each mixed number to an improper fraction.
- 2) Multiply the two numerators together.
- 3) Multiply the two denominators together.
- 4) Convert the result back to a mixed number if it is an improper fraction.
- 5) Simplify the mixed number.

Example: $5 \frac{2}{3} * 4 \frac{3}{5} =$

- 1) Convert each mixed number to an improper fraction. $17/3 * 23/5$
- 2) Multiply the two numerators together. $17 * 23 = 391$
- 3) Multiply the two denominators together. $3 * 5 = 15$
- 4) Convert the result to a mixed number. $391/15 = 26 \frac{1}{15}$
- 5) Simplify the mixed number if necessary (not necessary for this problem)

Measurement

Multiplying feet to inches

- 1) Convert feet and inches to inches by multiplying the feet by 12 and adding the number of inches
- 2) Perform the required multiplication to determine the number of inches. Convert the inches to feet and inches by dividing by 12.
- 3) The quotient is the number of feet and the remainder is the number of inches.

Example: Multiply 4 feet 8 inches times 4

Convert 5 feet to inches by multiplying 12 by 4:

$$12 * 4 = 48 \text{ inches}$$

Add the number of extra inches:

$$48 + 8 = 56 \text{ inches}$$

Perform the required multiplication:

$$56 * 4 = 224 \text{ inches}$$

Convert to feet and inches by dividing by 12:

$$224 \div 12 = 18 \text{ R } 8$$

The quotient (18) is the number of feet and the remainder (8) is the number of inches.

Answer: 18 feet 8 inches

Metric Volume

- 1) A liter is the basic unit of volume
- 2) A deciliter is 1/10 liter
- 3) A centiliter is 1/100 liter
- 4) A milliliter is 1/1000 liter

Volume of a Cube

To find the volume of a cube, or a rectangular shaped solid, multiply together the lengths of each dimension.

$$\text{Volume} = \text{length} * \text{width} * \text{height}$$

By definition a cube has all three equal. So, for example, if a cube is 4 cm x 4 cm x 4 cm, then its volume is:

$$4 * 4 * 4 = 64 \text{ cm}^3$$

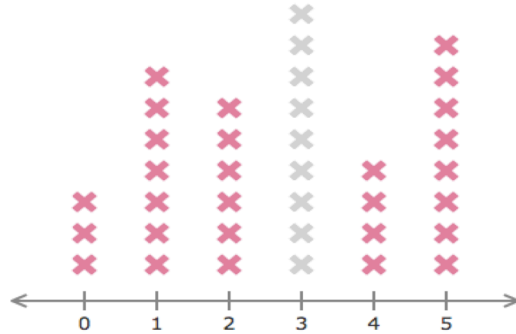
Plot line to display data

Mailing letters last week

4 1 3 5 3 5 2 3 1 0 4 2 2 1 5 3 5 3 0 2 1 3 5 2
1 1 2 5 0 5 1 5 3 4 4 3 3

Click to select the X's.

Mailing letters last week



Relating volume to the operations of different mathematical problems

The surface area of a prism = $2 \times \text{area of base} + \text{perimeter of base} \times H$

The actual formula used to find the surface area will depend on the shape of the base of the prism.

For example:

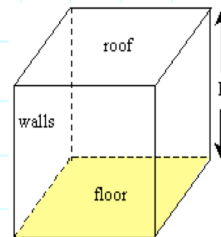
Rectangular based prism

Base shape: Rectangle, length 'L' and width 'W'

Area of base: $L \times W$

Perimeter of base: $2(L+W)$

Surface area = $2LW + 2(L+W)H$



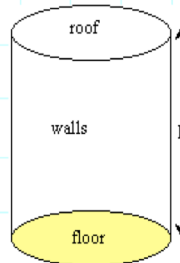
Circular based prism

Base shape: Circle, radius 'R'

Area of base: πR^2

Perimeter of base: $2\pi R$

Surface area = $2\pi R^2 + 2\pi RH$



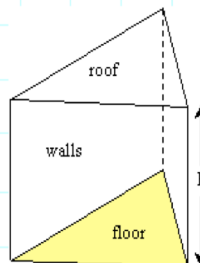
Triangular based prism

Base shape: Triangle: base 'b', height 'h', and sides S_1 , S_2 and S_3

Area of base: $\frac{1}{2}bh$

Perimeter of base: $S_1 + S_2 + S_3$

Surface area = $bh + (S_1 + S_2 + S_3)H$



Explain patterns in the number of zeros/multiply by powers of 10

- each 'power' is multiplied by 10
- $10^1 = 10$
 $10^2 = 100$
 $10^3 = 1000$

Explain why multiplying a whole number by a fraction without a whole number results in a number less than the original whole number

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

Generate two numerical patterns using two given rules

- Create an answer when a given a number that starts with 5, then add 6, and multiply by 3.
 - $5 + 6 \times 3 = 33$

Multiplying gallons, pints, and quarts

- 1) Convert gallons to pints by multiplying the number of gallons by 8.
- 2) Convert quarts to pints by multiplying the number of quarts by 2.
- 3) Add the above quantities and the number of original pints together.
- 4) Perform the required multiplication to determine the number of pints.
- 5) Convert the pints to gallons by dividing by 8.
- 6) The quotient is the number of gallons and the remainder is the number of extra pints.
- 7) Convert the extra pints to quarts by dividing the extra pints by 2.
- 8) The quotient is the number of quarts and the remainder is the number of pints.

Example: Multiply 4 gallons 3 quarts and 1 pint times 5

- 1) Convert 4 gallons to pints by multiplying 8 by 4:
 $8 * 4 = 32 \text{ pints}$
- 2) Convert 3 quarts to pints by multiplying 3 by 2:
 $3 * 2 = 6 \text{ pints}$
- 3) Add the pints from above and the number of original pints:
 $32 + 6 + 1 = 39 \text{ pints}$
- 4) Perform the required multiplication:
 $39 * 5 = 195 \text{ pints}$
- 5) Find the number of whole gallons by dividing by 8:
 $195 \div 8 = 24 \text{ R } 3$
- 6) Find the number of whole quarts by dividing the remainder by 2:
 $3 \div 2 = 1 \text{ R } 1$
- 7) The remainder of 1 is the number of pints.
- 8) Answer: 24 gallons 1 quart and 1 pint

Determine and justify the mean, range, mode, and median of a set of data
Find the mean, median, mode, and range for the following list of values:

13, 18, 13, 14, 13, 16, 14, 21, 13

1) The mean is the average:

$$(13 + 18 + 13 + 14 + 13 + 16 + 14 + 21 + 13) \div 9 = 15$$

2) The median is the middle value – REWRITE THE NUMBERS IN ORDER FROM LEAST TO GREATEST:

13, 13, 13, 13, 14, 14, 16, 18, 21

3) There are nine numbers in the list, so the middle one will be the $(9 + 1) \div 2 = 10 \div 2 = 5$ th number:

13, 13, 13, 13, 14, 14, 16, 18, 21

The mode is the number that is repeated more often than any other: 13 is the mode.

The largest value in the list is 21, and the smallest is 13, so the range is $21 - 13 = 8$.

mean: 15

median: 14

mode: 13

range: 8

