PERCENTS

If you have the whole amount it will be **100%**.

- **Decimal to %:** decimal * 100 (move deci. 2 to →)
- **% to Decimal:** % ÷ by 100 (move deci. 2 to ←)
- **Fraction to %:** top # ÷ bottom # *100
- **% to Fraction:** turn % to decimal then decimal to fraction (see ratio fraction decimal box)
- **Tax/tip/discount as a %:** figure out how much tax/tip/discount is by using the proportion below, to get final/total price take that answer and add (or subtract if it is discount) to price of item/bill

  $\frac{\text{x}}{\text{price of bill/item}} = \frac{\text{tax percent}}{100}$
- **% of increase/decrease:** find the amount of change by taking the original price (starting price) and subtracting the new price

  $\frac{\text{difference}}{\text{original price}} = \frac{\text{x}}{100}$
- **Simple Interest:** I = p·r·t [$ · % · time in years]
- **Percent OF**: multiply the amount by the decimal form of the %

ORDER OF OPERATIONS

Please: Parentheses ( )
Excuse: Exponents 5^2
My: Multiplication · or 4(5)
Dear: Division / or ÷
Aunt: Addition +
Sally: Subtraction -
*Work left to right for signs treated equally (M/D or A/S) (Ex. If you have – before +
do – first… L→R)

CROSS SECTIONS

- First name is the base
- Prism: rectangular faces
- Pyramids = triangular faces
- Perpendicular: cut up and down. Shows side view
- Parallel: cut sideways. Shows base view

RATIOS, FRACTIONS, & DECIMALS

- **Ratio:** a way to represent a fraction using :
- **Fraction:** part over whole
- **Decimal:** another way to represent a fraction. Top # ÷ bottom # = decimal
- Example of ¾:
  - Ratio- **3:4**
  - Fraction- ¾
  - Decimal- 3 ÷ 4 = **0.75**
- **Decimal to Fraction:** take the number after the decimal and put it over the place value (Ex. 0.625 → $^{625}/_{1000}$ because the 5 is in the thousandths place… now simplify… simplifies to 5/8)
- **Bar notation:** line that shows a # repeats. Ex. $0.\overline{3}$

SCALE FACTOR

- Used with maps, blue prints, etc
- Shrinks or enlarges objects
- PROPORTIONAL to original
- Ex. ½ inch = 3 ft where room's measurements on blueprint are 3 ½ inches by 4 inches… use a proportion to solve

	S.F.	Room
inches	.5	3.5
feet	3	x

	S.F	Room
inches	.5	3
feet	3	x

** Room is 21 feet by 18 feet

MEASUREMENT

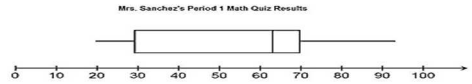
(length around = units)
(area = square units)

- **Area of square**: s^2 or l·w
- **Area of rectangle or parallelogram**: l·w (no slant height)
- **Area of triangle**: ½b·h or b·h÷2
- **Area of circle**: π·r^2 *multiply by fractions for partial circles*
- **Perimeter:** add all sides up (combine like terms when you have variables)
- **Circumference:** π·d

MEASURES OF CENTRAL TENDENCY AND RANGE

- **M of CT**: mean, median, mode
- **Mean:** add all up and divide by # of numbers you have, AKA average
- **Median:** middle number (put #s in order first), think MEDIAN of a road or MED is like MID or MEDIUM
- **Mode:** # that occurs the most often, think MOST often or MORE there is no mode if # each occur once, you can have more than one mode if you have the same amount of duplicate #s
- **Range:** difference between highest and lowest numbers, think of a MOUNTAIN RANGE b/c it has high and low points that you go between

BOX PLOTS (5 parts… order L→G)



- **Lower extreme:** lowest number/minimum
- **Lower quartile:** median of lower ½ #s
- **Median:** middle number
- **Upper quartile:** median of upper ½ #s
- **Upper extreme:** highest number/maximum
- 25% of data in each quartile
- **Interquartile range** (IQR) = UQ – LQ… 50% of data, located in the box
- **outlier**- # way out there compared to other #s, makes a whisker long, influence *mean* and *range*
- Spread/Variation/Distribution – makes sections longer or shorter based on how close the numbers are together. Small variation means numbers are similar, large variation means numbers are farther apart.

SURFACE AREA

(answers = squared)

- **Cube**: $6s^2$ or 6lw
- **Rectangular Prism**: 2(lw+lh+wh) or 2lw+2lh+2wh
- **Triangular Prism**: 2Base + area of each rectangular face

VOLUME

(answers = cubed)

- **Cube**: s^3 or lwh
- **Rect. Prism**: l·w·h
- **Triangular Prism**: ½·l·w·h
- **Cylinder**: $\pi r^2 h$

INTEGER RULES

- **Add or Subtract:** Same signs add and keep; different signs subtract, keep the sign of the bigger # then you'll be exact *** when subtracting a negative, you add! 4 – (-9) = 4 + 9 ***
- **Multiply or Divide:**
  Same signs = positive (+ · + = +) or (- · - = +)
  Different signs = negative (- · + = -) or (+ · - = -)

MULTIPLYING AND DIVIDING FRACTIONS

- Change all mixed #s to improper fractions FIRST!
- Multiply: $\frac{3}{8} \bullet \frac{6}{5} = \frac{3\bullet6}{8\bullet5} = \frac{18}{40} = \frac{18\div2}{40\div2} = \frac{9}{20}$
  multiply straight across, simplify
- Divide: $\frac{3}{4} \div \frac{2}{5} = \frac{3}{4} \bullet \frac{5}{2} = \frac{3\bullet5}{4\bullet2} = \frac{15}{8} = 1\frac{7}{8}$
  multiply by reciprocal (KCF), simplify

ADDING AND SUBTRACTING FRACTIONS

- Change all mixed #s to improper fractions FIRST!
- Must get **common denominators**!! Use integer rules. Simplify if possible.
- Add: $\frac{3}{8} + \frac{1}{3} = \frac{3\bullet3}{8\bullet3} + \frac{1\bullet8}{3\bullet8} = \frac{9}{24} + \frac{8}{24} = \frac{17}{24}$
- Subtract: $\frac{3}{10} - (-\frac{2}{5}) = \frac{3\bullet1}{10\bullet1} - (-\frac{2\bullet2}{5\bullet2}) = \frac{3}{10} - (-\frac{4}{10}) = \frac{3}{10} + \frac{4}{10} = \frac{7}{10}$

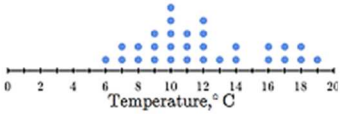
GRAPHS

- **Stem and Leaf**

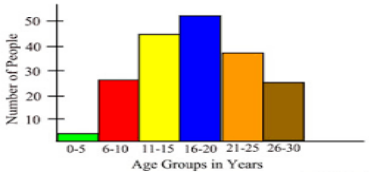
2	1	4	5	5	6
3	1	2	2	7	
4	5				

Key 2|4 = 24

- The left is the stem (tens place in this case) and the leaves are on the right (ones place)
- Numbers should be in order from least to greatest with the smaller numbers being closest to the stem
- **Line Plot/Dot Plot:** shows repetition in data



- **Histograms:** a type of bar graph that uses intervals (0-4, 5-9, 10-14…). The intervals must be the same and a number can't be in more than 1 set (Ex. In the intervals above, 10 is only used in one set).



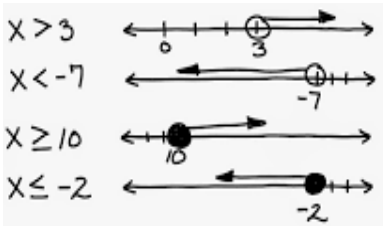
SOLVING TWO STEP EQUATIONS

- Do the inverse operation and work backwards with order of operations to get x by itself. What you do to one side you have to do to the other.
- Example:

$$\begin{array}{r|r} -2x + 3 = 15 & \\ -3 \quad -3 & \\ \hline -2x = 12 & \\ -2 \quad -2 & \\ \hline x = -6 & \end{array}$$

- ALWAYS CHECK by plugging it in!
- If using inequalities (<, >, ≤, ≥), if you **multiply** or **divide** by a **negative** # then the sign changes direction.
- ***If*** the variable is on the left side, the inequality will point in the direction of the graph.

< or > use open circle
≤ or ≥ use closed circle



DISTRIBUTIVE PROPERTY

- **Distributive Property** in algebra:

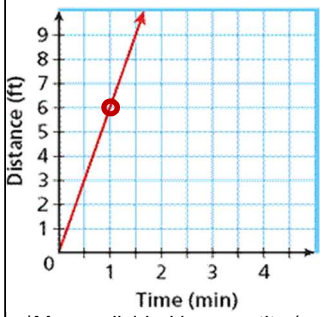
-3(x-4) = -18
-3*x + -3*-4 = -18
-3x + 12 = -18
-12 -12
-3x = -30
-3 -3
x = 10

Check:
-3(10-4) = -18
-3(6) = -18
-18 = -18 √

COORDINATE PLANE

- **Coordinates on a grid:** (x,y)
- **Origin:** the starting point (0,0).
- **Graphing:** Go left or right first, then up or down.
- **Constant of Proportionality:**
  aka: unit rate, slope, k, y/x
  Must pass through the point (0,0)
- **Finding COP:**
  *y = ___ x ex. y = ***0.26***x
  *When x = 1, y = COP on a graph

ex: Speed of a Sloth



(1, 6) so the COP is 6.

*Money divided by quantity (unit rate)
ex. $4.28 for 4 apples. $1.07 each
*Y value divided by X value in a table

x	**Number of Days**	1	2	3	4
y	**Hours Worked**	6	12	18	24

6÷1 = ***6***, 12÷2 = ***6***, 18÷3 = ***6***…

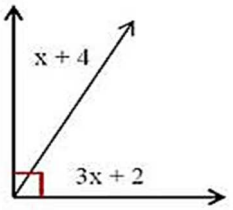
WORDS TO KNOW

- **Variable:** a letter used in place of an unknown number
- **Substitution:** when you plug a number in for a variable
- **Linear:** a straight line (nonlinear = not straight)

ANGLES

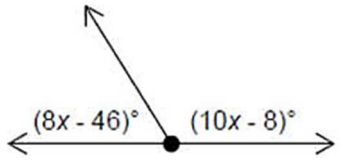
- **Acute:** less than 90°
- **Obtuse:** greater than 90°
- **Right:** exactly 90°
- **Straight:** exactly 180°

- **Complementary:** 2 or more angles that add up to 90°



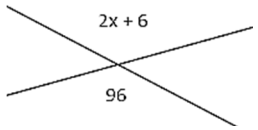
Add angles and set equal to 90
x + 4 + 3x + 2 = 90
Combine like terms and solve
4x + 6 = 90
4x = 84
x = 21

- **Supplementary:** 2 or more angles that add up to 180°



Add angles and set equal to 180
8x – 46 + 10x - 8 = 180
Combine like terms, solve
18x – 54 = 180
18x = 234
x = 13

- **Vertical Angles:** Angles opposite when lines intersect. Equal to each other.
  2x + 6 = 96
  2x = 90
  x = 45



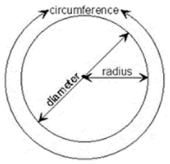
- **Degrees in a shape:**
  Triangles: 180° Quadrilaterals: 360° Circles: 360°

TRIANGLE INEQUALITY THEOREM

- The two smallest sides of a triangle must add to be greater than the largest side. Think toothpick activity. a + b > c
- Smallest side is opposite smallest angle; largest side is opposite largest angle in every triangle

CIRCLES

- Radius: from the center to the edge; ½ diameter or diameter ÷2
- Diameter: distance across the circle; 2 times the radius
- Area = πr^2
- Circumference = πd



TEST TIPS

- Get plenty of rest the night before & eat breakfast.
- Brain Dump formulas and notes ASAP!
- RELAX!!!! Use stress relieving techniques.
- Use process of elimination.
- You can write in your test book so WRITE ALL OVER IT.
- Highlight/underline/circle important words.
- Circle your correct answer in the test book so if you get off on your bubble sheet you can easily go back and fix things.
- **BELIEVE IN YOURSELF!! YOU HAVE THE KNOWLEDE!!**