Some Key Vocabulary to Keep in Mind

Unit A: Expressions and Equations

Topic 1

➢ Expression (NO = SIGN) vs. Equation (EQUAL SIGN)

➢ <u>Numerical Expression</u>: contains numbers and operational symbols

➢ <u>Algebraic Expressions</u>: contains numbers, variables, and operational symbols

➢ <u>Order of Operations</u>:

P – ( )
E – Exponents
M ←→ D Whichever comes first.
A ←→ S

➢ Exponents: $4^3 = 4 \cdot 4 \cdot 4$ or 64, 4 is the <u>Base</u> and 3 is the <u>Exponent or Power</u>

➢ Variable: (Unknown) Letter / Coefficient: # in front of Variable / Constant: Number All Alone

➢ Term: Either a single number or a variable, or number and variable multiplied together separated by a + or – sign.

➢ **Sum (+), Difference (-), Product (×)** Factors (#'s being Multiplied)**, Quotient (÷)**

Topic 2

➢ <u>Equivalent Numerical Expressions</u>: When you evaluate them, they equal the same value.

➢ Identity Property of Addition: $3+0=3$

➢ Identity Property of Multiplication: $7 \cdot 1 = 7$

➢ Zero Property of Multiplication: $5 \cdot 0 = 0$

➢ Commutative Property of Addition/Multiplication: $3 \cdot 4 = 4 \cdot 3$

➢ Associative Property of Addition/Multiplication: $3 + (4+6) = (3+4) + 6$

➢ **Distributive Property:** $3(4x+5) = 12x+15$

➢ **Greatest Common Factor**: Highest number that divides evenly into two or more numbers

Find the GCF of 24 and 18.

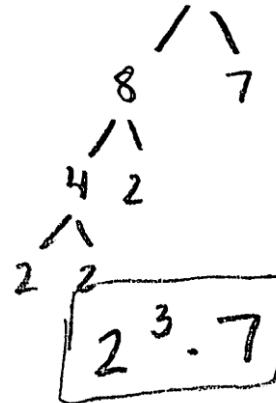➤ **Least Common Multiple**: SKIP COUNT. First # the two or more numbers have in common.

Find the LCM of 8 and 12.

8: 8, 16, (24) 32, 40 (48), 56, 64...

12: 12 (24) 36, (48) 60 ..

$$LCM = 24$$

➤ Prime Numbers: Only 2 factors, 1 and itself.

➤ Prime Factorization: Factor Tree → Find the Prime Factorization of 56

➤ $y + y + y + y = 4y$ while $y \cdot y \cdot y \cdot y = y^4$

8   7

4 2

2   2

$$2^3 \cdot 7$$

Topic 3

➤ Solve and Check the Following Equation:

$3x - 5 = 13$
$+5 \quad +5$

$\dfrac{3x}{3} = \dfrac{18}{3}$

$x = 6$

P: $3x - 5 = 13$

S: $3(6) - 5 = 13$

S: $18 - 5 = 13$

$13 = 13$ ✓

➤ Inverse Operations: Operations that Undo Each Other.

➤ ○ → < and >   ● → ≤ and ≥

➤ Equations have **ONE Solution.** Inequalities have **INFINITE Solutions.**

Topic 4

➤ **Dependent Variable**: Changes in response to another Variable (y)

➤ **Independent Variable:** Affects change on the Dependent Variable (x)

Topic 5 and Topic 6

➢ Numerator: Top of Fraction / Denominator: Bottom of Fraction
➢ Improper Fraction: Top is Bigger than Bottom / Proper Fraction: Top is Smaller than Bottom
➢ Mixed Number: A Whole Number and a Fraction
➢ Simplest Form = Lowest Terms
➢ Reciprocals: $\dfrac{3}{7} \rightarrow \dfrac{7}{3}$
➢ **If the Product of TWO Numbers is 1 → The numbers are RECIPROCALS**
➢ Multiply   Divide

$$4 \cdot 5\dfrac{3}{8}$$

$$4\dfrac{2}{3} \div \dfrac{7}{9}$$

$$\dfrac{\overset{1}{\cancel{4}}}{1} \cdot \dfrac{43}{\underset{2}{\cancel{8}}} = \dfrac{43}{2} = \boxed{21\tfrac{1}{2}}$$

$$\dfrac{14}{3} \div \dfrac{7}{9}$$

$$\dfrac{\overset{2}{\cancel{14}}}{\underset{1}{\cancel{3}}} \cdot \dfrac{\overset{3}{\cancel{9}}}{\underset{1}{\cancel{7}}} = \dfrac{6}{1} = \boxed{6}$$

Unit C: Number System Part 2

Topic 7

➢ **Rational Numbers:** Can be written as a simple fraction.
➢ Adding/Subtracting with Decimals: LINE UP DECIMAL POINTS
➢ Multiplying with Decimals: Ignore the decimal point and multiply normally. Then count how many decimal places the 2 numbers have combined. Starting at the right of your answer, move that many decimal places to the left and place the decimal point.
➢ Dividing with Decimals: Move the point to the right to make the divisor a whole number. Move the decimal the same amount of spaces to the right in the dividend.

- On a Number Line: Smaller Numbers ⟵⟶ Larger Numbers
- **Opposite of a Number**: 8 → -8 / -8 → 8 / $-(-8)=8$
- **Absolute Value**: $|-9|=9$ / $|9|=9$ / $-|-9|=-9$
- **Distance is Always Positive**
- Ordered Pair or Coordinates (x , y): x: side to side y: up and down
- Quadrants:

II | I

III | IV
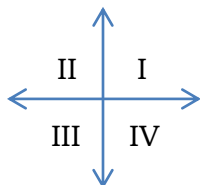
- Converting a Decimal to Fraction: 0.84 is eighty-four *hundredths* or $\dfrac{84}{100}=\dfrac{21}{25}$
- Converting Fraction to Decimal: DIVIDE → Top Number Goes "In the House."
- Equivalent Fractions: Two Fractions that Are Equal → Same Decimal

Unit D: Ratio and Proportional Relationships

- **Ratio**: Relationship for every x units of one quantity there are y units of another quantity.
- Representing a Ratio:
  - Using a Colon: 9:16
  - Fraction: $\dfrac{9}{16}$
  - Decimal: 0.5625
  - Words: For every 9 fiction books, Billy has 16 non-fiction books.
- Equivalent Ratios express the same relationship
  - Same Decimal / Equal Cross Products / Will Reduce to Same Fraction.
- You can find equivalent ratios by multiplying or dividing each term of the ratio by the same nonzero number.

➤ **Rate**: A ratio involving 2 quantities measured in Different Units.

➤ **Unit Rate/Price:** A Rate/Price for ONE UNIT. Unit Rate as a Fraction the Denominator is 1.

➤ Conversion Factors are used to convert 2 Units of Measure

   o **Reference Sheet has Many Conversion Factors**

   o 1 Yard = 3 Feet

   o 1 Foot = 12 Inches

   o 1 Yard – 36 Inches

➤ **Proportional Relationship:** Goes Through (0, 0)

➤ Slope of a Proportional Relationship: $\dfrac{\text{rise}}{\text{run}} = \dfrac{\text{change in y}}{\text{change in x}}$

➤ **Percents:** $\dfrac{\%}{100} = \dfrac{\text{part}}{\text{whole}}$ Proportion Application: $\dfrac{\%}{100} = \dfrac{\text{is}}{\text{of}}$

➤ **Tax / Tip / Markup / Interest:** Calculate the Percent and ADD to Total.

➤ **Discount / Markdown:** Calculate the Percent and SUBTRACT from Total.

➤ Polygon: A closed figure formed by 3 or more line segments

➤ Vertex: Any point where two sides of a polygon meet

➤ Parallel Lines DO NOT Cross / Perpendicular Lines Meet AT A 90° ANGLE

➤ Area:

   o Square: $\text{Area} = (\text{side})^2$

   o Rectangle: Area = base × height

   o Parallelogram: Area = base × height

   o Triangle: $\text{Area} = \dfrac{\text{base} \times \text{height}}{2}$

   o **Trapezoid**:

$$\text{Area} = \dfrac{h \cdot (b_1 + b_2)}{2}$$

- <u>Base and Height Make a Right Angle (Perpendicular)</u>
- Area of Polygon: Split Shape Up into Squares, Rectangles, and Triangles and Add together all Area
- **Area of the Shaded Region:** Area of Big Shape – Area of Smaller Missing Piece

Topic 14

- **Face:** Sides of a 3D Solid / **Edge:** Where 2 Faces meet / **Vertex:** Corner
- Name a polygon by its Base (Bottom)
    - Prisms: 2 Parallel and Identical Bases
    - Pyramids: Faces meet at a Single Vertex
- **Net:** Flat Representation of ALL Sides of a 3D solid.
- **Surface Area:** ADD up AREA of ALL SURFACES
- **Volume**: How much Space is Inside a Solid
    - Rectangular Prism: Volume = length × width × height