Name: _____   Block: _____ Teacher: _____

GSE Algebra 1

Unit 1 Notes: Relationships between Quantities and Expressions

DISCLAIMER: We will be using this note packet for Unit 1. You will be responsible for bringing this packet to class EVERYDAY. If you lose it, you will have to print another one yourself. An electronic copy of this packet can be found on my class blog.

Standard	Sub-Standard	Lesson
MGSE9–12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.	**MGSE9–12.A.SSE.1a** Interpret parts of an expression, such as terms, factors, and coefficients, in context.	
	MGSE9–12.A.SSE.1b Given situations which utilize formulas or expressions with multiple terms and/or factors, interpret the meaning (in context) of individual terms or factors.	
MGSE9–12.A.APR.1 Add, subtract, and multiply polynomials; understand that polynomials form a system analogous to the integers in that they are closed under these operations. (Operations with polynomials limited to the second degree.)		
MGSE9–12.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.		
MGSE9–12.N.RN.3 Explain why the sum or product of rational numbers is rational; why the sum of a rational number and an irrational number is irrational; and why the product of a nonzero rational number and an irrational number is irrational.		
MGSE9–12.N.Q.1 Use units of measure (linear, area, capacity, rates, and time) as a way to understand problems:	a. Identify, use, and record appropriate units of measure within context, within data displays, and on graphs;	
	b. Convert units and rates using dimensional analysis (English–to–English and Metric–to– Metric without conversion factor provided and between English and Metric with conversion factor);	
	c. Use units within multi–step problems and formulas; interpret units of input and resulting units of output.	
MGSE9–12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. Given a situation, context, or problem, students will determine, identify, and use appropriate quantities for representing the situation.		
MGSE9–12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. For example, money situations are generally reported to the nearest cent (hundredth). Also, an answers' precision is limited to the precision of the data given.		

Unit 1:Relationships between Quantities and Expression

After completion of this unit, you will be able to…

After completion of this unit, you will be able to…

Learning Target #1: Algebraic Expressions
- Review creating an expression from a verbal description
- Review interpreting parts of an Expression in terms of a context

Learning Target #2: Operations with Polynomials
- Classify polynomials by degree and terms
- Add polynomials
- Subtract polynomials
- Multiply polynomials
- Apply operations of polynomials to real world problems

Learning Target #3: Radical Expressions
- Simplify Radical Expressions
- Multiply Radical Expressions
- Add & Subtract Radical Expressions
- Rational & Irrational Numbers

Learning Target #4: Dimensional Analysis
- Convert units using dimensional analysis (Metric to Metric & customary to customary) without conversion factor provided
- Convert units using dimensional analysis (between customary & Metric) with conversion factor provided
- Define appropriate units for both metric and customary systems
- Apply dimensional analysis to rates

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			1st	2nd Day 1 – Algebraic Expressions
August 5th Day 2 – Creating & Translating Algebraic Expressions	6th Day 3 – Classifying Polynomials/ Adding & Subtracting Polynomials	7th Day 4 – Multiplying Polynomials (Area Model)	8th Milestone Assessment **Quiz over Days 1 – 4**	9th Day 5 – Review Perfect Squares/Simplifying Radical Expressions
12th Day 6 - Simplifying Radical Expressions w/ Operations	13th Day 7 – Classifying Rational & Irrational Numbers **Quiz over Days 5 – 7**	14th Day 8 – 1 & 2 Step Dimensional Analysis	15th Day 9 – Multi-Step Dimensional Analysis Metric Conversions & Appropriate Units	16th Unit 1 Review
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Day 1 – Algebraic Expressions

Standard: MGSE9–12.A.SSE.1a

Interpret parts of an expression, such as terms, factors, and coefficients, in context.

An expression containing variables (letters), numbers, and operation symbols is called an

_____ _____.   An expression does NOT contain an equal sign.

An example of an algebraic expression is $5x + 7y – 3$.

In an algebraic expression, there are four different parts: coefficients, variables, constants, and terms.

$5x + 7y - 3$

Variables are the letters in an expression.

Coefficients are the numbers in front of the variables.

Constants are the "plain numbers" or terms without variables.

Terms are separated by a + or – sign and can be numbers and/or variables.

Factors of each term are the numbers or expressions that when multiplied produce a given product.

Practice: Complete the table below.

Expression	List Terms	List Factors of 1st Term	List Coefficients	List Variables	List Constants
$2x + 5z - 3$					
13					
$6m^3 – 9m^2 + s – 4$					
$x^2 + 7x -1$					

Combining Like Terms

Terms with the same variable raised to the same exponent are **like terms.**

Like: 3x and -7x	**Like**: $2y^2$ and $6y^2$	**Not Like**: 4x and $6x^2$
		Why???

Directions: Simplify the following expressions:

1. -3x + 6x

2. y – 3 + 6 – 2y

3. $\frac{4x+6y}{2} - 3y$

4. 8m + 1n – 3 + 10

5. $9x – 10x^2 + 7x – 3$

6. $x + 2y + \frac{3x-9y}{3}$

Distributive Property

Distributive Property states….
$$a(b+c) = ab + ac$$

1. 5(x + 2)

2. -3(x – 4)

3. -6(-2x – 3)

4. 4x - 5(x – 1)

5. -2(4 + x) + 4(2 – 8x) + 5

6. 2(3 + x) + x(1 – 4x) + 5

Evaluating Expressions

When you **evaluate** an expression, you are replacing the variable with what the variable equals:

Evaluate 4x – 5   when x = 6

Practice: Evaluate the following expressions if m = 7, r = 8, and t = -2.

a. 5m – 6

b. $\frac{r}{t}$

c. 3m – 5t

d. $t^2 – 4r$

Day 2 – Creating & Translating Algebraic Expressions

Standard(s): MGSE9–12.A.SSE.1

Interpret expressions that represent a quantity in terms of its context.

Creating Algebraic Expressions

Review: The Commutative and Associative Properties

Commutative Property of Addition (order doesn't matter) 5 + 6 can be written as 6 + 5 _Commutative Property of Multiplication_ (order doesn't matter) 5 x 6 can be written as 6 x 5	_Associative Property of Addition_ (grouping order doesn't matter) 2 + (5 + 6) can be written as (2 + 6) + 5 _Associative Property of Multiplication_ (grouping order doesn't matter) (2 x 5) x 6 can be written as 2 x (6 x 5)

Addition	Subtraction	Multiplication	Division	Exponents
Sum	Difference	Of	Quotient	Power
Increased by	Decreased by	Product	Ratio of	Squared
More than	Minus	Times	Each	Cubed
Combined	Less	Multiplied by	Fraction of	
Together	Less than	Double, Triple	Out of	
Total of	Fewer than	Twice	Per	
Added to	How many more	As much	Divided by	
Gained	Left	Each	Split	
Raised	**Use Parenthesis:** The quantity of			
Plus				

Subtraction and **Division** can be very tricky because order DOES matter unlike **Addition** and **Multiplication.**
Take a look at the following verbal descriptions:

Addition The sum of x and 4.	Multiplication The product of x and 3.	Subtraction The difference of x and 5. x decreased by 5 Five less than x	Division The quotient of x and 7 The ratio of x and 7

Practice: Write the expression for each verbal description:

1. The difference of a number and 5

2. The quotient of 14 and 7

3. y decreased by 17

4. x increased by 6

5. The sum of a number and 8

6. 6 squared

7. Twice a number

8. 8 more than a third of a number

9. 6 less than twice k

10. Five divided by the sum of a and b.

11. The quotient of k decreased by 4 and 9.

12. 2 minus the quantity 3 more than p

13. Half of the quantity 1 less than w

14. Nine less than the total of a number and 2.

15. The product of a number and 3 decreased by 5

Practice: Write each as a verbal expression. You may not use the words add, subtract (minus), times, or divide.

1. $\dfrac{x}{2}$

2. $a + 9$

3. $5n - 7$

4. $3(y + 7)$

Creating Expressions from a Context

Trey is selling candy bars to raise money for his basketball team. The team receives $1.25 for each candy bar sold. He has already sold 25 candy bars.

a. If Trey sells 10 more candy bars, how much money will he raise for the basketball team?

b. If Trey sells 45 more candy bars, how much money will he raise for the basketball team?

c. Write an expression to represent the unknown amount of money Trey will raise for the basketball team. Let c represent the additional candy bars sold.

Understanding Parts of an Expression

a. Hot dogs sell for $1.80 each and hamburgers sell for $3.90 each. This scenario can be represented by the expression 1.80x + 3.90y. Identify what the following parts of the expression represent.

1.80	
3.90	
x	
y	
1.80x	
3.90y	
1.80x + 3.90y	

b. Noah and his friends rent a sailboat for $15 per hour plus a basic fee of $50. This scenario can be represented by the expression 15h + 50.

15	
h	
15h	
50	
15h + 50	

c. A teacher has $600 to spend on supplies. They plan to spend $40 per week on supplies. This scenario can be represented by the expression 600 – 40w.

600	
-40	
w	
-40w	
600 – 40w	

Day 3 – Classifying & Adding/Subtracting Polynomials

Standard: MGSE9–12.A.APR.1

Add, subtract, and multiply polynomials; understand that polynomials form a system analogous

to the integers in that they are closed under these operations.

Definition

A _____ is an expression that can have constants, variables, and exponents.
Polynomials **CANNOT** contain:
- Radicals
- Fractional exponents
- Negative exponents
- Variables in the denominator

POLYNOMIALS

Facts/Characteristics

Polynomials are named by their _____ and number of _____.
- The **degree** is the _____ exponent of a variable.
- **Example:** What is the degree of the following?
  a) $2x^2 + 5x - 3$ b) $4x - 3x^5 + 2x^2 - 1$

Examples

List 3 examples of polynomials

Non-Examples

Cross off all expressions that are **NOT** polynomials:

$$\frac{1}{x^3}$$ $$3x^4 - \sqrt{x}$$ $4x^2$ $6x^{-2} - 3x$

$-9 + x$ $-8x^5 + 2x - 7$

STANDARD FORM - the terms are arranged in _____ order from the _____ exponent to the

_____ exponent.

DEGREE - the _____ exponent of the variable in the polynomial.

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Rewrite each polynomial in standard form. Then identify the degree of the polynomial:

a. $5x - 6x^2 - 4$ b. $-7x + 8x^2 - 2 - 8x^2$ c. $6(x - 1) - 4(3x^2) - x^2$

Standard Form: Standard Form: Standard Form:

Degree: Degree: Degree:
└───┘

Classifying Polynomials

Polynomials are classified by **DEGREE** and **NUMBER OF TERMS:**

"First Name"

Degree	Name	Example
0		
1		
2		
3		
4 +		

"Last Name"

Terms	Name	Example
1		
2		
3		
4+		

Complete the table below. Simplify the expressions or put in standard form if necessary.

Polynomial	Degree	# of Terms	Classification
$8x$			
10			
$-24 + 3x - x^2$			
$7x - 9x + 1$			
$4x^2 - 5x^3 - 4 + 5x - 1$			
$2x + 3 - 7x^2 + 4x + 7x^2$			

Adding Polynomials

When adding, use the following steps to add polynomials:
- Get rid of the parentheses first!
- Identify and combine like terms
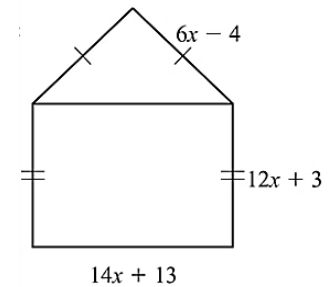- Make sure final answer is in standard form

a. $(4x^2 + 2x + 8) + (8x^2 + 3x + 1)$

b. $(-2x + 5) + (-4x^2 + 6x + 9)$

Application: Find an expression that represents the perimeter of the house.

What does it mean to find the perimeter of an object?

Perimeter of the house:

$6x - 4$

$12x + 3$

$14x + 13$

Subtracting Polynomials

Subtracting polynomials is similar to adding polynomials except we have to take care of the minus sign first. Subtracting polynomials require the following steps:

- Change the sign of the terms in the parentheses after the subtraction sign
- Identify and combine like terms
- Add (Make sure final answer is in standard form)

a. $(7x^2 - 2x + 1) - (-3x^2 + 4x - 7)$

b. $(3x^2 + 5x) - (4x^2 + 7x - 1)$

c. $(5x^3 - 4x + 8) - (-2 + 3x)$

d. $(3 - 5x + 3x^2) - (-x + 2x^2 - 4)$

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Day 4 – Multiplying Polynomials

Standard: MGSE9–12.A.APR.1

Add, subtract, and multiply polynomials; understand that polynomials form a system analogous to the integers in that they are closed under these operations.

To multiply polynomials, we will use the **Area Model**.

Area Model

a. $4x(x + 3)$

b. $(x - 3)(x + 7)$

c. $(x + 5)^2$

d. $(x - 4)(x + 4)$

e. $(3x + 6)(2x - 7)$

f. $(x - 3)(2x^2 + 2)$

More Practice Problems

Solve these problems using the Area Model.

1) $(x - 7)(x + 4)$

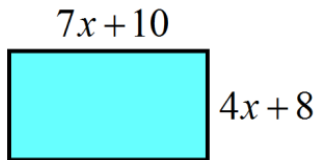2) $(x - 9)^2$

3) $(x + 10)(x - 10)$

4) $x(x - 12)$

5) $(3x + 7)(2x + 1)$

6) $(4x - 5)(3x - 6)$

Applications Using Polynomials
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1. Write an expression that represents the area and perimeter of this rectangle.

$7x + 10$

$4x + 8$

2. You are designing a rectangular flower bed that you will border using brick pavers. The width of the board around the bed will be the same on every side, as shown.

 a. Write a polynomial that represents the total area of the flower bed and border.
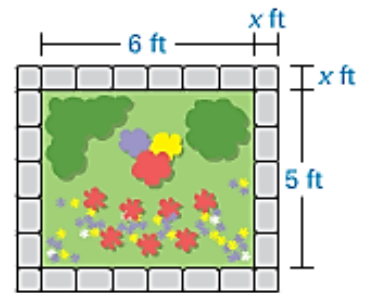
 b. Find the total area of the flower bed and border when the width of the border is 1.5 feet.
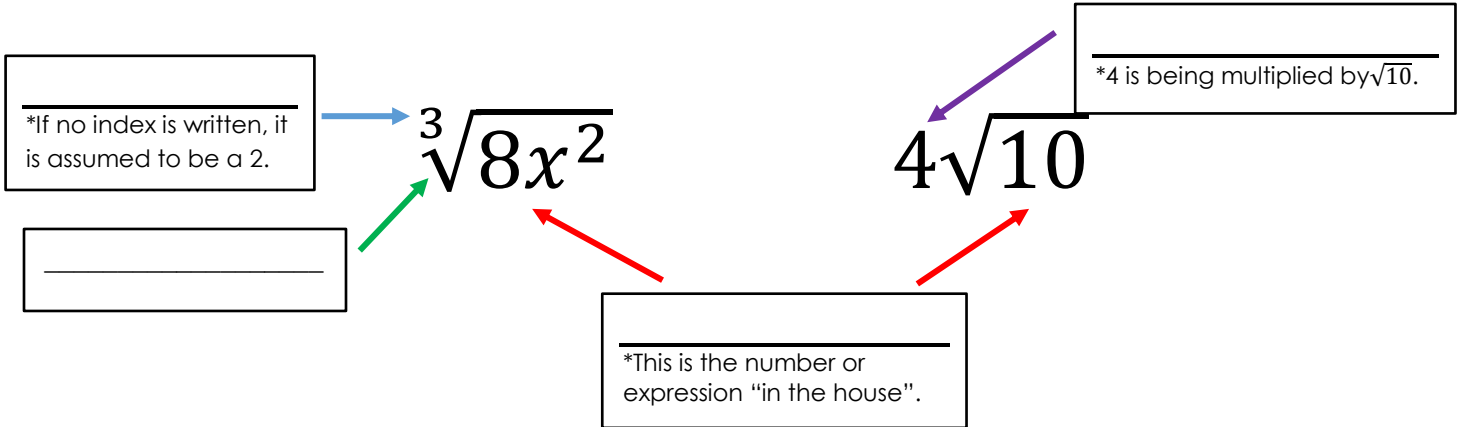
3. Find the expression that represents the area not covered by the mailing label.
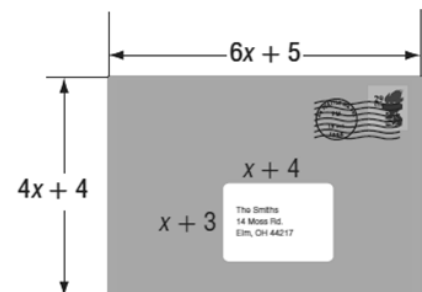
Day 5 - Simplifying Radical Expressions

Standard(s): MGSE9–12.N.RN.2

Rewrite expressions involving radicals and rational exponents using the properties of exponents.

*If no index is written, it is assumed to be a 2.

$$\sqrt[3]{8x^2}$$

_____

*This is the number or expression "in the house".

*4 is being multiplied by $\sqrt{10}$.

$$4\sqrt{10}$$

Square Root Table

Complete the table below.

Square each of the following numbers.	1	2	3	4	5	6	7	8	9	10	x
Perfect Squares											
Take the square root of each of your perfect squares.	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
Square Roots											

Taking square roots and squaring a number are _____ or they undo each other, just like adding and subtracting undo each other.

Review: Factors

A factor is a _____ or mathematical _____ that divides another number or expression **evenly**.

Example: What are the factors of the following?
a) 24   b) 45   c) 17   d) y^4

Simplifying Radicals

A radical expression is in **simplest form** if no perfect square factors other than 1 are in the radicand (ex. $\sqrt{20} = \sqrt{4 \cdot 5}$)

Guided Example: Simplify $\sqrt{80}$.

Step 1: Find the factors of the number inside the radical.	
Step 2: Chose the pair of factors that contains the largest perfect square.	
Step 3: Find the square root of the perfect square and leave the other root as is, since it cannot be simplified.	
Step 4: Simplify the expressions both inside and outside the radical by multiplying.	

Practice:

a. $\sqrt{25}$ b. $\sqrt{24}$ c. $5\sqrt{32}$ d. $-2\sqrt{63}$

Simplifying Radicals with Variables

Step 1: If the problem contains an even exponent: · Divide the exponent by 2 · The radical sign goes away!	a) $\sqrt{x^4}$ b) $\sqrt{x^{50}}$	c) $\sqrt{x^3}$
Step 2: If the problem contains an odd exponent: · Break the problem up into 2 powers · One should have the highest even exponent · The other exponent should be 1 · The sum of both exponents should be the original exponent		
Step 3: Simplify the expressions both inside and outside the radical by multiplying.		

a. $\sqrt{x^8}$

b. $\sqrt{x^5}$

c. $\sqrt{y^4 z^3}$

Simplifying Radical Expressions with Square Roots

When simplifying radical expressions, you simplify both the coefficients and variables using the same methods as you did previously (Remember $\sqrt{x^2} = x$; square and square roots undo each other).
Remember, anything that is left over stays under the radical!

a) $\sqrt{9x^6}$

b) $\sqrt{4x^4}$

c) $\sqrt{32z^7}$

d) $\sqrt{45y^2}$

e) $2\sqrt{108x^5 y^9}$

f) $-8\sqrt{48g^4 h^7}$

Day 6 – Simplifying Radical Expressions w/ Operations

Standard(s): Standard(s): MGSE9–12.N.RN.2

Rewrite expressions involving radicals and rational exponents using the properties of exponents

When multiplying radicals, follow the following rules:

Multiplying Radicals – RULE

1. Multiply the _____ together.

2. Multiply the _____ together.

3. _____ the radical.

Directions: Multiply the following radicals. Make sure they are in simplest form.

a. $\sqrt{2} \cdot \sqrt{18}$

b. $\sqrt{5} \cdot \sqrt{10}$

c. $-\sqrt{6} \cdot 3\sqrt{8}$

Multiplying Radicals with Variables

Recall- Law of Exponents: When multiplying expressions with the same bases, _____ the exponents.

1. $x^2 \cdot x^5 =$

2. $a^3 \cdot a^4 =$

3. $y^2 \cdot y^5 \cdot z^2 =$

Directions: Multiply the following radicals. Make sure they are in simplest form.

a. $\sqrt{3x} \cdot \sqrt{15x}$

b. $-4\sqrt{10x^3} \cdot -4\sqrt{6x}$

c. $-3\sqrt{8x^4z} \cdot -7\sqrt{y^3z^5}$

Adding and Subtracting Radicals

To add and subtract radicals, you have to use the same concept of combining "like terms", in other words, your radicands must be the same before you can add or subtract.

Explore: Simplify the following expressions:

a. $4x + 6x$ b. $5x^2 - 2x^2$ c. $8x^2 + 3x - 4x^2$

Adding/Subtracting Radicals – RULE

1. _____ all radicals

2. Then add/subtract the _____ radicals

Practice:

a. $2\sqrt{5} + 6\sqrt{5}$ b. $6\sqrt{7} + 8\sqrt{10} - 3\sqrt{7}$ c. $4\sqrt{15} - 6\sqrt{15}$

d. $11\sqrt{5} - 2\sqrt{20}$ e. $3\sqrt{3} + 6\sqrt{27}$ f. $3\sqrt{3} - 2\sqrt{12}$

Putting It All Together: Simplify each expression.

a. $\sqrt{5}(\sqrt{10} - \sqrt{15})$ b. $-\sqrt{5}(\sqrt{10} + 3)$ c. $-3\sqrt{3}(4\sqrt{6} - 2\sqrt{2})$

Day 7: Classifying Rational & Irrational Numbers

Standard(s): MGSE9–12.N.RN.3
Explain why the sum or product of rational numbers is rational; why the sum of a rational number and an irrational number is irrational; and why the product of a nonzero rational number and an irrational number is irrational.

Natural Numbers
Whole Numbers
Integers

Natural

Whole

Integers

Rational Numbers   Irrational Numbers
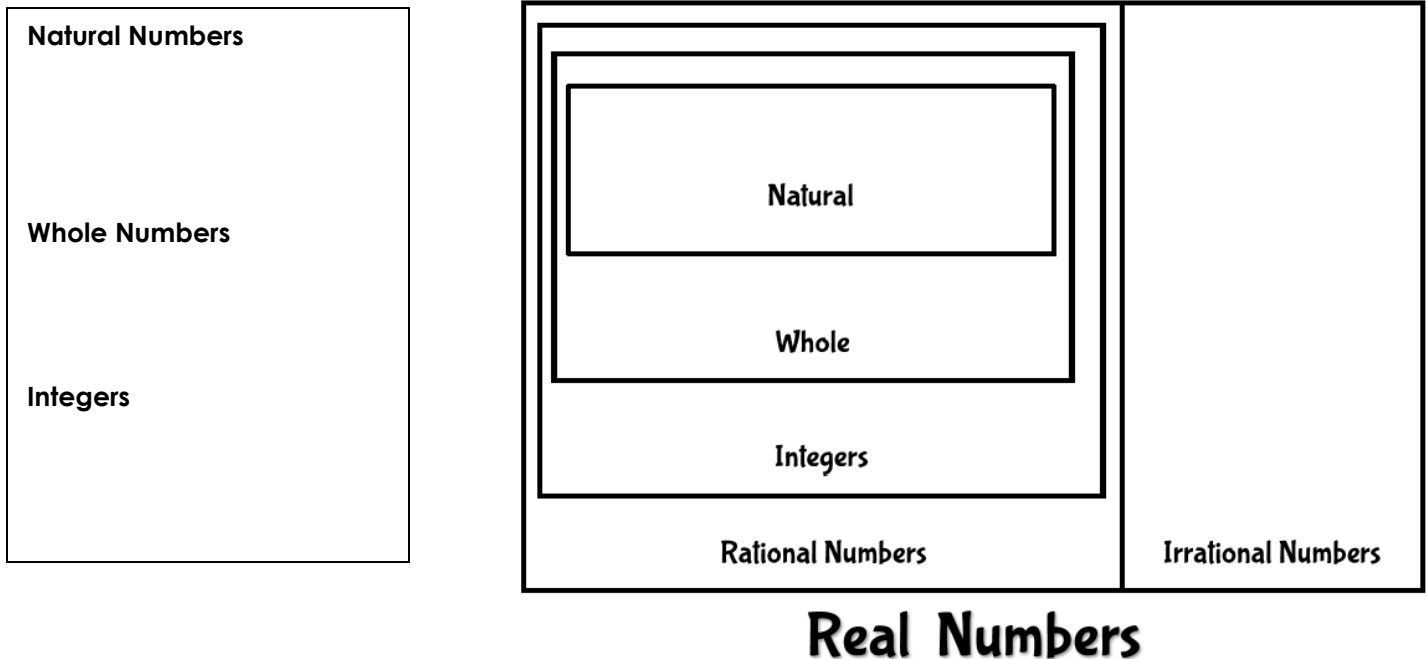
Real Numbers

Rational Numbers:
- o Can be expressed as the quotient of two integers (i.e. a <u>fraction</u>) with a denominator that is not zero.
- o Counting/Natural, Integers, Fractions, and Terminating & Repeating decimals are rational numbers.
- o Many people are surprised to know that a repeating decimal is a rational number.
- o $\sqrt{9}$ is rational - you can simplify the square root to 3 which is the quotient of the integers 3 and 1.

<u>Examples</u>: -5, 0, 7, 3/2, $0.\overline{26}$

Irrational Numbers:
- o Can't be expressed as the quotient of two integers (i.e. a <u>fraction</u>) such that the denominator is not zero.
- o If your number contains π, a radical (not a perfect square), or a decimal that goes on forever (does not repeat), it is an irrational number.

<u>Examples</u>: $\sqrt{7}$, $\sqrt{5}$, π , 4.569284….

Is it Rational?

Remember that a bar over digits indicates a recurring decimal number, e.g. $0.2\overline{56}=0.2565656...$

1. For each of the numbers below, decide whether it is rational or irrational.

  Explain your reasoning in detail.

5	
$\dfrac{5}{7}$	
0.575	
$\sqrt{5}$	
$5+\sqrt{7}$	
$\dfrac{\sqrt{10}}{2}$	
5.75....	
$(5+\sqrt{5})(5-\sqrt{5})$	
$(7+\sqrt{5})(5-\sqrt{5})$	

Day 8: One & Two Step Dimensional Analysis

Standard: MGSE9–12.N.Q.1

Convert units and rates using dimensional analysis (English–to–English and Metric–to– Metric without conversion factor provided and between English and Metric with conversion factor);

There are many different units of measure specific to the U.S. Customary System that you will need to remember. The list below summarizes some of the most important.

Measurement	Time	Capacity	Weight
1 foot = _____ inches	1 minute = _____ seconds	1 cup = _____ fl. oz	1 ton = _____ lbs
1 yard = _____ feet	1 hour = _____ minutes	1 pint = _____ cups	1 lb = _____ oz
1 mile = _____ feet	1 day = _____ hours	1 quart = _____ pints	
1 mile = _____ yards	1 week = _____ days	1 gal = _____ quarts	
	1 year = _____ weeks		

In order to convert between units, you must use a conversion factor. A **conversion factor** is a fraction in which the numerator and denominator represent the same quantity, but in different units of measure.

Examples: 3 feet = 1 yard: $\dfrac{3\,\text{feet}}{1\,\text{yard}}$ OR $\dfrac{1\,\text{yard}}{3\,\text{feet}}$ | 100 centimeters = 1 meter: $\dfrac{100\,\text{cm}}{1\text{m}}$ OR $\dfrac{1\text{m}}{100\,\text{cm}}$

Multiplying a quantity by a unit conversion factor changes only its units, not its value. It is the same thing as multiplying by 1.

$$\frac{100\,\text{cm}}{1\text{m}} = \frac{100\,\text{cm}}{100\,\text{cm}} = 1$$

The process of choosing an appropriate conversion factor is called **dimensional analysis.**

Exploring Dimensional Analysis

1. Describe the patterns you notice with the following equations and how the final answer was determined:

a.

$$\bigcirc \ \text{X} \ \frac{\square}{\bigcirc} \ \text{X} \ \frac{\triangle}{\square} \ = \ \triangle$$

b.

$$\frac{\heptagon}{\star} \ \text{X} \ \frac{\star}{\lightning} \ \text{X} \ \frac{\heartsuit}{\heptagon} \ = \ \frac{\heartsuit}{\lightning}$$

The patterns I noticed were…

2. Determine what should be in each question mark:

a.

$$\starburst \ \text{X} \ \frac{\blacklozenge}{\starburst} \ \text{X} \ \frac{\bigcirc}{\blacklozenge} \ = \ ?$$

b.

$$\square \ \text{X} \ \frac{\odot}{\square} \ \text{X} \ \frac{\smiley}{?} \ = \ \smiley$$

Practicing Dimensional Analysis

Scenario 1 : How many feet are in 72 inches?

Step 1: Write the given quantity with its unit of measure.	
Step 2: Set up a conversion factor. (Choose the conversion factor that cancels the units you have and replaced them with the units you want. $$\frac{\text{what you want}}{\text{what you have}}$$	
Step 3. Divide the units (only the desired unit should be left).	
Step 4: Solve the problem using multiplication and/or division.	

Scenario 2: How many cups are in 140 pints?

Possible Conversion Factors:

Scenario 3: How many pounds are in 544 ounces?

Possible Conversion Factors:

Multi-Step Dimensional Analysis

How many seconds are in a day?

Most of us do not know how many seconds are in a day or hours in a year. However, most of us know that there are 60 seconds in a minute, 60 minutes in an hour, and 24 hours in a day. Some problems with converting units require multiple steps. When solving a problem that requires multiple conversions, it is helpful to create a flowchart of conversions you already know, set up your conversion factors, and solve your problem.

Flowchart: Days→ Hours → Minutes → Seconds

Conversion Factors: 60 sec = 1 min,   60 min = 1 hr   24 hours = 1 day

Scenario 4: How many inches are in 3 miles?

Flowchart:

Scenario 5: How many centimeters are in 900 feet? (2.54 cm = 1 in)

Flowchart:

Scenario 6: How many gallons are in 250 mL? (1 gal = 3.8 liters)

Flowchart:

Scenario 7: Mrs. Wheaton is approximately 280,320 hours old. How many years old is she?

Day 9: More Dimensional Analysis & Metric Conversions

Standard: MGSE9–12.N.Q.1

Convert units and rates using dimensional analysis (English–to–English and Metric–to– Metric

without conversion factor provided and between English and Metric with conversion factor);

Most of the rates we are going to discuss today include both an amount and a time frame such as miles per hour or words per minute. When we convert our rates, we are going to change the units in **both** the numerator and denominator.

a. Ms. Howard can run about 2 miles in 16 minutes. How fast is she running in miles per hour?

b. Convert 36 inches per second to miles per hour.

c. Convert 45 miles per hour to feet per minute.

d. Convert 32 feet per second to meters per minute. (Use 1 in = 2.54 cm)

Metric Conversions

A helpful way to remember the order of the prefixes is **King Henry Died Unusually Drinking Chocolate Milk**.

King	Henry	Died	Unexpectedly	Drinking	Chocolate	milk
k	h	d	U	d	c	m
kilo	hecto	deka	UNIT GRAM METER LITER	deci	centi	milli

- When moving the decimal to the left, you are dividing by a power of 10.
- When moving the decimal to the right, you are multiplying by a power of 10.
- When comparing two quantities, make sure they are in the same unit before comparing.

Examples: Convert from one prefix to another

A. 2500 dL = _____ kL   B. 38.2 dkg = _____ cg   C. 5 dm = _____ m

D. 1000 mg = _____ g   E. 14 km = _____ m   F. 1 L = _____ mL

Examples: Compare measurements using <, >, or =.
(Hint: They have to be written in the same units of measure before you can compare.)

A. 502 mm _____ .502 m   B. 90,801 cg _____ 5 hg   C. 160 dL _____ 1.6 L

Defining Appropriate Units – Mixed Multiple Choice

1. Sandra collected data about the amount of rainfall a city received each week. Which value is MOST LIKELY part of Sandra's data?
   a) 3.5 feet
   b) 3.5 yards
   c) 3.5 inches
   d) 3.5 meters

2. What is a good unit to measure the area of a room in a house?
   a) Square feet
   b) Square miles
   c) Square inches
   d) Square millimeters

3. If you were to measure the volume of an ice cube in your freezer, what would be a reasonable unit to use?
   a) Cubic feet
   b) Cubic miles
   c) Square feet
   d) Cubic inches

4. Which unit is the most appropriate for measuring the amount of water you drink in a day?
   a) Kiloliters
   b) Liters
   c) Megaliters
   d) Milliliters