Name:_____Date:_____Period:_____

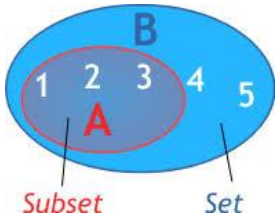
1-1 The Language of Mathematics

Standard

- B.N.RN.A.1. Use rational and irrational numbers in calculations and in real world context.

Objective

- SWBAT develop a thorough understanding of sets and set notation IOT understand set notation and how to use symbols to describe sets.



Key Concepts

_____- a collection of distinct items.

_____- each distinct item in a set.

_____- If A and B are sets, then A is a subset of B, written A ⊆ B when each element of A is also an element of B.

_____- a set that contains a finite number of elements.

_____- a set that contains an infinite number of elements.

_____ or _____- a set that contains no elements.

_____- a symbol (usually a letter) standing for an unknown value in an equation.

_____- statement that two numbers or expressions are equal.

_____- any sentence that contains one or more variables.

_____- the set of all possible values for the variable in an open sentence.

_____- the set of all elements in the replacement set that makes the sentence true.

Examples

1. (I do) Write " the set of natural numbers" using the following notation:
   a. set-builder notation

   b. roster notation

2. (I do) Write the following using symbols
   a. set A contains elements 2, 4, 6 and 8.

   b. set B is a subset of set A.

   c. x is an element of set C.

   d. 12 is not an element of {1, 3, 5, 7}.

   e. set D is the null set or empty set.

3. (We do) Rewrite {0, r} ∈ {r} so that it is correct.

4. (They do) Determine all possible subsets of the set {a, b, c}.

5. (They do) Determine which of the values -2 and 4 are solutions to the equation $4x + 3 = 19$.

6. (They do) Josh's earnings equaled the sum of Aimee's and twice Nora's earnings. Josh earned $104 and Aimee earned $32. Using the equation $104 = 32 + 2x$ and the replacement set {32, 36, 40} for x. Find the amount Nora earned.

----------Lesson 1-1 Independent Practice/Lesson Check----------

EXERCISES

Use the following sets $A = \{2, 4\}$, $B = \varnothing$, $C = \{2, 4, 6, 8, 10\}$, and $D = \{-2, -1, 0, 1, 2\}$ for Exercises 1–8. Tell if each statement is true or false.

1. $1 \in D$ _____ **2.** $1 \in A$ _____ **3.** $-2 \in D$ _____ **4.** $-3 \in D$ _____

5. $A \subset C$ _____ **6.** $B \subset D$ _____ **7.** $C \subset A$ _____ **8.** $B \subset A$ _____

9. Write all the possible subsets of the set $\{x, y\}$. _____

Define each set using roster notation.

10. odd numbers greater than 5

_____

11. even negative numbers with a value less than -3

_____

Which of the given values is a solution of each equation?

12. $6 - m = 4; -2, 2$ _____ **13.** $4n + 6 = 30; 6, 9$ _____

14. $b + 7 = -8; -1, -15$ _____ **15.** $j \div 12 = 2; 6, 24$ _____

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1-2 Real Numbers

Standard

- B.N.RN.A.1. Use rational and irrational numbers in calculations and in real world context.

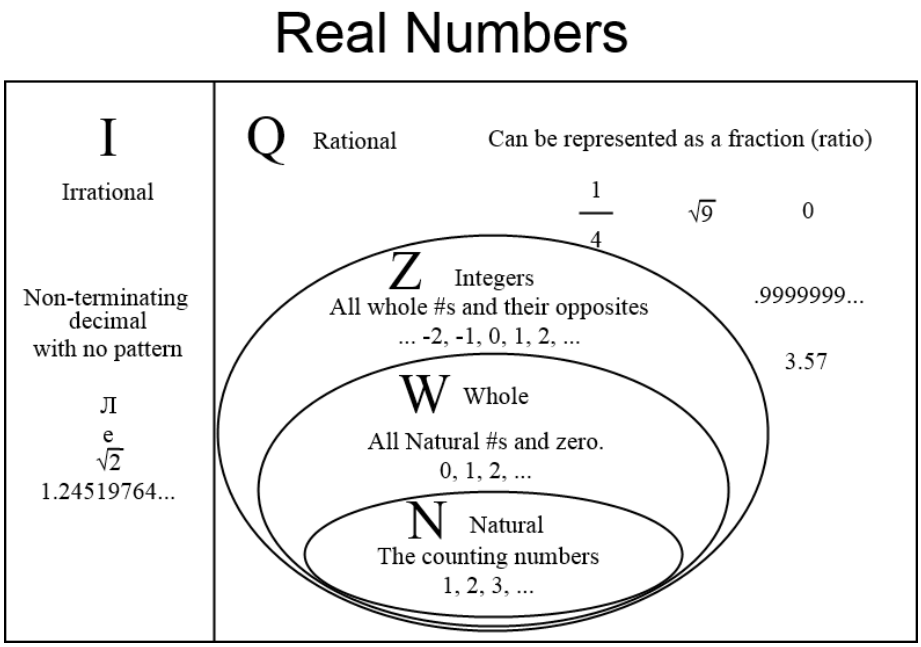
Objectives

- SWBAT develop a thorough understanding of both rational and irrational numbers IOT make both historical and concrete connections between irrational numbers and the real world.
- SWBAT identify and graph real numbers IOT perform operations with them.

Key Concepts

_____- The number on the number line corresponding to a point.

_____- The distance from zero to a given point.



Examples

1. (I do) To which set does each number belong:
   a. 7 b. -0.8 c. $\sqrt{29}$ d. $\sqrt{144}$

2. (I do) Graph the numbers $-4, \frac{3}{2}, \sqrt{5}, -\frac{12}{5}$, and π on the number line.

3. (We do) Graph the following sets on the number line.

   a. the set of integers from -2 to 3, inclusive

   b. the set of real numbers from -2 to 3 inclusive

   c. {all real numbers less than or equal to 2}

   d. {all real numbers greater than -2}

4. (They do) Evaluate the expression when $m = -5$.
   a. $-m$ b. $-(-m)$ c. $|m|$ d. $-|-m|$

----------**Lesson 1-2 Independent Practice/Lesson Check**----------

EXERCISES

Tell whether each statement is true or false.

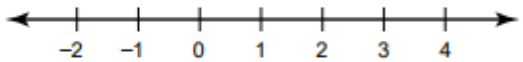
1. $\sqrt{2}$ is a rational number. _____ **2.** -42 is an integer. _____

3. 0 is a natural number. _____ **4.** $-\frac{3}{5}$ is an integer. _____

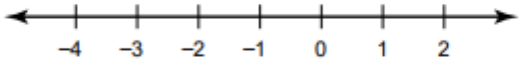
5. 213 is a whole number. _____ **6.** 0.31131113 is an irrational number. _____

Graph each set of numbers on a number line.

7. $\left\{\frac{1}{5}, -1\frac{3}{8}, \sqrt{2}, 3.9\right\}$



8. real numbers less than or equal to -1



Evaluate each expression where $b = -0.8$.

9. $-b$ _____ **10.** $-(-b)$ _____ **11.** $|b|$ _____

12. $-|b|$ _____ **13.** $|-b|$ _____ **14.** $-|-b|$ _____

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1-3 Union & Intersection of Sets

Standard

- B.N.RN.A.1. Use rational and irrational numbers in calculations and in real world context.

Objective

- SWBAT use math symbols to describe sets IOT describe the relationships among sets and elements of sets.

Key Concepts

_____- is formed by joining all the elements of one set with those of others.

_____- is formed with the elements that are in common in one or more sets.

_____-uses circles inside a rectangle to represent sets and set operations.

_____ or _____-typically labeled as set U or represented by a rectangle in a Venn diagram.

_____- the subset of all elements of U that ae not elements of set A.

_____- two sets whose intersection is empty.

_____- an inequality that combines two inequalities.

Examples

1. (I do) Write "the union of sets A and B" using the following notation:
    a. Set-builder notation

    b. Symbolized notation

2. (I do) Write “the intersection of sets A and B” using the following notation:
    a. Set-builder notation

    b. Symbolized notation

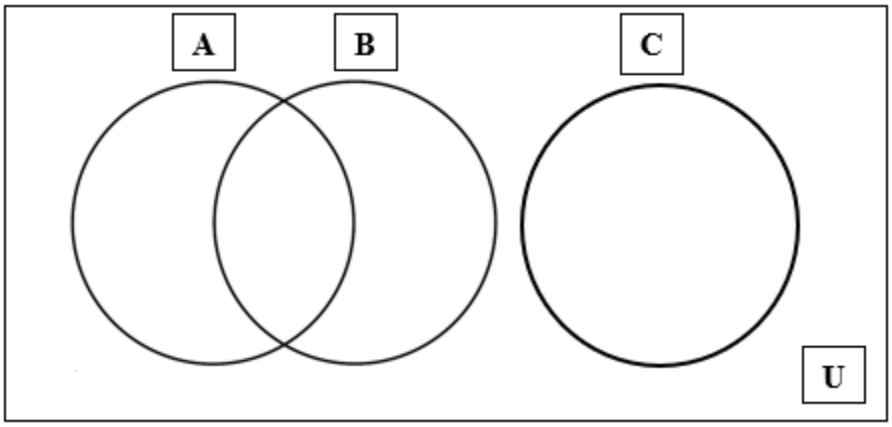
3. (I do) Write “the complement of set A” using the following notation:

    a. Set-builder notation

    b. Symbolized notation

4. (We do) Consider the sets U = {1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5}, B = {3, 6} and C = {2, 4}.
    a. Create a Venn diagram that represents the sets.

    b. C’



    c. A ∪ B

    d. A ∩ B

    e. A ∩ C

    f. (A ∩ B)’

    g. (A ∪ B) ∪ C

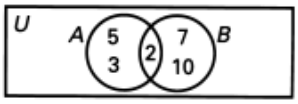
5. (They do) Use the set of real numbers as the replacement set to find the solution set for $x \geq -1$ and $x < 4$.

6. (They do) Use the set of real numbers as the replacement set to find the solution set for $x \geq 4$ or $x < -1$.

----------**Lesson 1-3 Independent Practice/Lesson Check**----------

EXERCISES

Refer to the diagram. Find the sets named by listing the members.

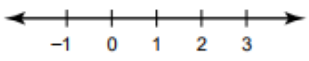


1. A' _____ **2.** $A \cap B$ _____ **3.** $A \cup B$ _____

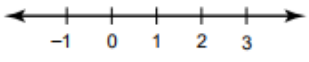
Graph the solution sets for each compound inequality. Then describe the solution set in two ways using roster notation and set-builder notation.

4. $x > 2$ or $x \leq -1$

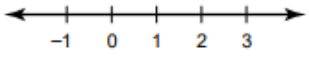
Graph of A if $A = x > 2$



Graph of B if $B = x \leq -1$



Graph of $A \cup B$: $x > 2$ or $x \leq -1$



Roster notation: _____

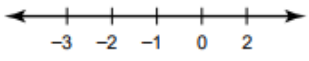
_____

Set-builder notation: _____

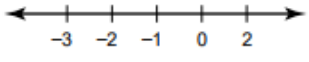
_____

5. $x \geq -3$ and $x < 0$

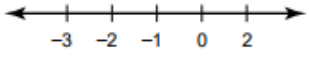
Graph of A if $A = x \geq -3$



Graph of B if $B = x < 0$



Graph of $A \cap B$: $x \geq -3$ and $x < 0$



Roster notation: _____

_____

Set-builder notation: _____

_____

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1-7 Distributive Property & Properties of Exponents

Standard

- B.N.Q.A.3 Solve problems involving squares, square roots of numbers, cubes, and cube roots of number.

Objectives

- SWBAT use properties of exponents IOT evaluate and simplify expressions.
- SWBAT will use the distributive property IOT evaluate and simplify expressions.

Key Concepts

_____- a number written in this form has a base and an exponent.

_____- tells what factor is being multiplied.

_____- tells how many equal factors there are.

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

Transitive Property If $a = b$, and $b = c$, then a = c.

Reflexive Property $a = a$, any number is equal to itself

Substitution Property If $a = b$, then b can be substituted for a in any statement.

Symmetric Property If $a = b$, then $b = a$

Properties of Exponents $a^m a^n = a^{m+n}$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(ab)^m = a^m b^m$$

$$(a^m)^n = a^{mn}$$

Examples

1. (I do) Use the distributive Property to find the product of $16 \cdot 15 - 16 \cdot 5$.

2. (I do) Evaluate the expression. Let $a = -2$ and $b = 3$
   a. a^2 b. $-a^2$ c. ab^2

3. (We do) Simplify.
   a. $x^2 \cdot x^7$ b. $(a^3)^5$ c. $(5^2 \cdot n)^2$

4. (We do) Simplify
   a. $\frac{a^7}{a^2}$ b. $(\frac{t}{3})^4$ c. $(\frac{x^2}{3})^4$ d. $(\frac{c^5}{c^2})^3$

----------**Lesson 1-7 Independent Practice/Lesson Check**----------

EXERCISES

Use the distributive property to find each product.

1. $0.8(10 - 0.9)$ **2.** $3\left(\frac{1}{6} - \frac{5}{12}\right)$ **3.** $4\left(1\frac{3}{4}\right)$ **4.** $-0.9(10) - 0.9(4)$

Evaluate each expression when $x = -0.1$ and $y = 1.5$.

5. x^3 **6.** xy^2 **7.** $(y - x)^2$ **8.** $y^2 \div -0.75$

Simplify.

9. $(x^3)^4$ **10.** $a^4 \cdot a^2$ **11.** $b^3 \div b^2; b \neq 0$ **12.** $(a^2b^3)^2$

13. x^0 **14.** $x^5 \div x^2; x \neq 0$ **15.** $(7^4 \cdot a^2)^2$ **16.** $x^2 \cdot x^5$

Name:_____Date:_____Period:_____

1-8 Exponents & Scientific Notation

Standards

- B.N.Q.A.3 Solve problems involving squares, square roots of numbers, cubes, and cube roots of number
- B.A.SSE.A.1 Use properties of multiplication and division to solve problems containing scientific notation.

Objectives

- SWBAT use properties of exponents IOT simplify and evaluate variable expressions with negative exponents.
- SWBAT write numbers in scientific notation IOT multiply and divide numbers expressed in scientific notation.

Key Concepts

_____-derived from the quotient rule and used in scientific notation

_____- uses powers of 10 to write large and small numbers more concisely.

Examples

1. (I do) Simplify each expression using the properties of exponent.
   a. $a^9 \div a^{-5}$ b. $x^4 \cdot x^{-3}$ c. $(a^3)^{-5}$

2. (We do) Evaluate.
   a. a^{-5} when $a = 2$ b. pq^3 when $p = 2 \; and \; q = -2$

3. (We do) Write the number in scientific notation.
   a. 6,789,000 b. 0.000526 c. 0.006052

4. (We do) Write the number in standard form.
   a. 3.6×10^{5} b. 4.3×10^{-4} c. 2.095×10^{-7}

5. (They do) The mass of an oxygen atom is 2.66×10^{-23} grams. What is the approximate mass of 1 billion oxygen atoms?

----------**Lesson 1-8 Independent Practice/Lesson Check**----------

EXERCISES

Simplify each expression, using properties of exponents.

1. $(x^4)^{-2}$ **2.** $(-x^2)^2$ **3.** $x^{-6} \cdot x^6; x \neq 0$ **4.** $b^7 \div b^{-8}$

5. $m^{12} \div m^{16}$ **6.** $c^{-2} \div c^8$ **7.** $a^{-5} \cdot a^{-6}$ **8.** $r^8 \cdot r^{-5}$

Write each number in scientific notation.

9. 42,093 **10.** 729,000,000 **11.** 0.0074 **12.** 0.000621

Write each number in standard form.

13. $7.3 \cdot 10^3$ **14.** $6.52 \cdot 10^{-3}$ **15.** $4.21 \cdot 10^4$ **16.** $9.1 \cdot 10^{-4}$