Name _____

Algebra 2
Lesson 1-1
Properties of Real Numbers
Part 1: Sets of Numbers

A **set** is a collection of things called **elements**.

Examples: the set of all numbers on a die are {1, 2, 3, 4, 5, 6}
the set of days in a week are {Mon., Tues., Wed., Thurs., Fri., Sat., Sun.}

A **subset** is a set of elements whose elements all belong to another larger set.

Examples: the set of all even numbers on a die are {2, 4, 6}
the set of weekend days are {Sat., Sun.}

An **empty** or null set {∅} is a set containing no elements.

Examples: the set of negative numbers between 1 and 10 ={∅}
the set of months that have six weeks={∅}

There are five (5) sets of numbers that form the foundation for all of the mathematics. The three dots (. . .) is a notation used to mean "and so on and so on into infinity."

Natural Numbers= {1, 2, 3, 4, …}
Whole Numbers= {0, 1, 2, 3, 4,…}
Integers = {…-4, -3, -2, -1, 0, 1, 2, 3, 4, …}
Rational Numbers = {all numbers that can be expressed as a ratio of two integers} = All integers + all fractions. Examples: {-2, 6, 25, $\frac{1}{3}$, 4, 7.5}
Irrational Numbers= {all numbers that are NOT rational and their decimal forms do NOT terminate or repeat. Examples: {π, $\sqrt{3}$, $6\sqrt{7}$}

Notice that some numbers can belong to several sets of numbers while others can belong to only one set of numbers. For example, 3 can belong to all of the sets of numbers <u>except</u> Irrational Numbers. Why?

The number 0.25 can belong to only the _____numbers. Then number $\sqrt{11}$ can only belong to the Irrational Numbers.

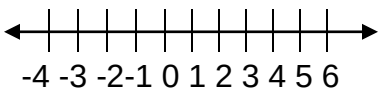
Number sets can be represented in several ways:

Words: The set of numbers on a six-sided die are 1 through 6.

Roster: {1, 2, 3, 4, 5, 6}

Interval: [1,6]

Number Line:



Set Builder notation: $\{x \mid x \text{ is an integer and } 1 \leq x \leq 6\}$ read as "the set of all x's such that x is an integer between 1 and 6 inclusive."

Interval notation: **[** or **]** means the number is included, while **(** or **)** means number is not included.

Name_____

Algebra 2
Problem Set 1-1 part 1

1. Classify each number to the sets of number it belongs.

a) -2.4

b) $\sqrt{30}$

c) 2π

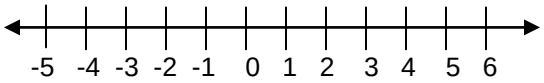
d) $\frac{-5}{2}$

2. Order the list of numbers from least to greatest.

5, $\sqrt{17}$, -2.3, $-2\frac{3}{7}$, $\frac{2\pi}{3}$, 6.3333

3. a) Rewrite $x \geq -1$ in interval notation.

b) Rewrite [-2,3] as a number line.



c) Rewrite the set of even integers between 6 and 24 inclusive in roster notation.

d)Rewrite {2, 4, 6, …, 20} in words.

4. Answer with **True or False.**

a) Every integer is a whole number

b) Every integer is a rational number

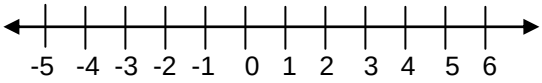
c) Every irrational is not a whole number.

d) A repeating decimal like 2.3333…. is an example of a rational number.

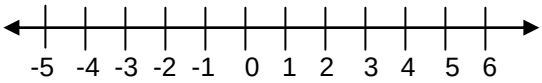
e) A number like $\frac{4}{0}$ is an irrational number.

5. Fill in the number lines.

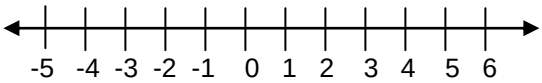
a) $-2 \leq x \leq 4$



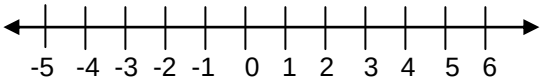
b)The set of integers between -3 and 5.



c) $y \neq 2$.



6. Use a number line to represent [-1,2) and (3, +∞) on a number line.



7. Translate, “the multiples of 4 up to 100” into a roster.

8. What is the main difference between an undefined quantity and an irrational number?

9. The formula for the area of a circle is: πr^2 . Will the area for circle ever be a rational number? Briefly explain.

10. Will the product of two irrational numbers ever be rational? Briefly explain.