**Lesson 26 Notes: Irrational and Real Numbers**

**Answer Key**

**Sets of Numbers:**

Natural

Whole

Integers

Rational

Irrational

Real

counting numbers

{1, 2, 3, 4, …}

N

O and counting numbers…..Start with O

{0, 1, 2, 3, 4, ……}

W

whole numbers and their negatives

{….-3, -2, -1, 0, 1, 2, 3, 4, …}

Z

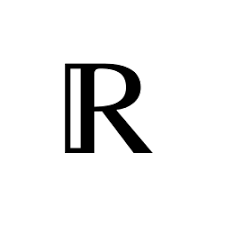
any number that can be expressed as a fraction 2/3 0.75 8

Q

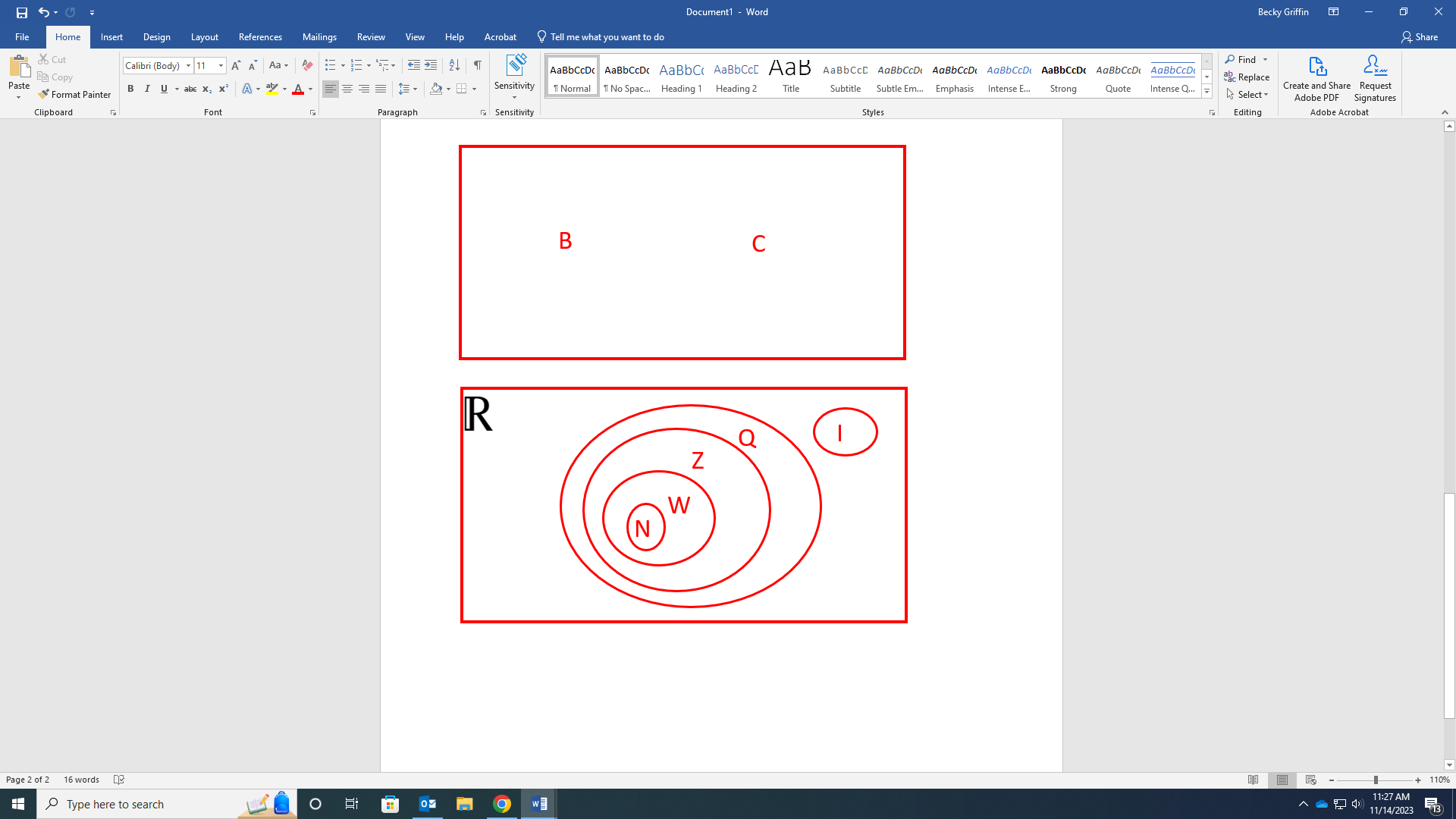
any number that cannot be expressed as a fraction non-repeating decimals

I

ALL numbers, rational and irrational

Symbol: 

R

**Draw a Venn Diagram** to represent these sets of numbers:

For fractions, how do you know if the fraction terminates or repeats?

If the denominator has prime factorization of 2 or 5, then the fraction terminates!

If the fraction has any other prime factorization, it repeats!

For decimals, how do you know if the decimal is actually a rational number?

If the decimal is actually a “fraction”, then the decimal will terminate or repeat.

Give examples of decimals that terminate but are still a rational number.

0.58 0.63 0.99 58/100 63/100 99/100

Give examples of decimals that repeat but are still a rational number.

0.5 0.626262…. 0.3 5/9 62/99 1/3

**Example A:** Identify the set(s) of numbers to which each given number belongs. Use the letters N, W, Z, Q, I and R.

-12 Z Q R

I R

.23 Q R

130 N W Z Q R

Q R

Q R

I R

N W Z Q R

**PROPERTIES OF REAL NUMBERS** - N W Z Q I R

1. Closure Property for Addition

4 + 5 = 9

1. Closure Property for Multiplication

4 x 5 = 20

1. Commutative Property for Addition

4 + 5 = 5 + 4

1. Commutative Property for Multiplication

4 x 5 = 5 x 4

1. Associative Property for Addition

A + (B + C) = (A + B) + C

1. Associative Property for Multiplication

A x (B x C) = (A x B) x C

1. Identity Property for Addition

4 + 0 = 4

1. Identity Property for Multiplication

4 x 1 = 4

1. Inverse Property for Addition

4 + (-4) = 0

10. Inverse Property for Multiplication

4 \* (1/4) = 1

11. Distributive Property of Multiplication over Addition

A (B + C) = AB + AC