**Lesson 5 Notes: Sets and Venn Diagrams**

**ANSWER KEY**

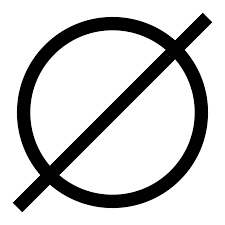
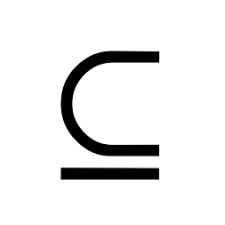
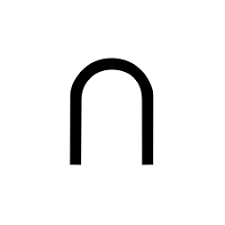
Definition of **Set**:

a collection of objects called elements

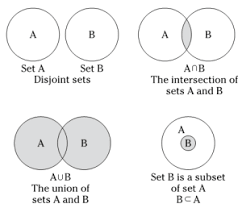
Definition of **Venn Diagram**:

a way to visually represent sets using circles and a rectangle

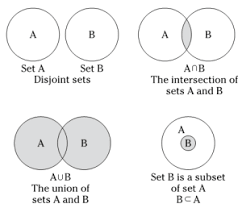
**Relationships Between Sets:**

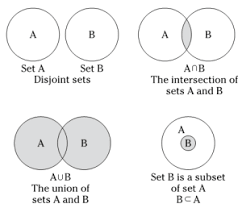
**Disjoint**  **Subset**  **Overlapping/Intersecting** 

two sets share common elements



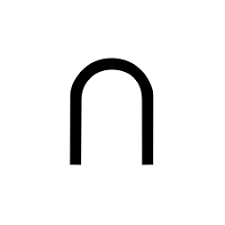
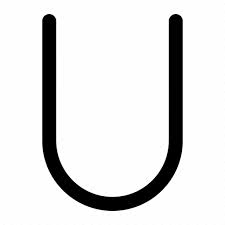
every element in one set is IN the other set

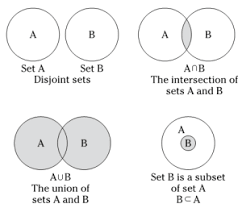
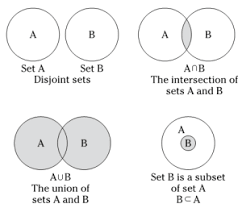


two sets are disjoint if they have no common elements

**Operations on Sets:**

**Intersection** **Union** **Complement**

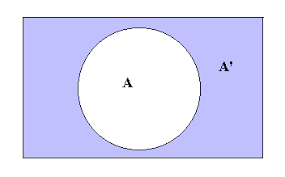
 

All elements in BOTH sets

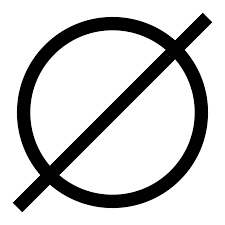
NOT in the given set

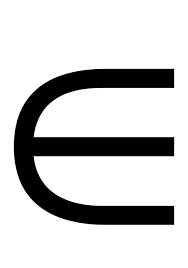
A’ Ac

overlapping, in common



**Other Symbols on Sets:**





means “empty set” – a set with no elements

means “an element of”

**Example 1**:

Using the whole numbers 1 to 10, let

Set A = {1, 3, 5, 7, 9}

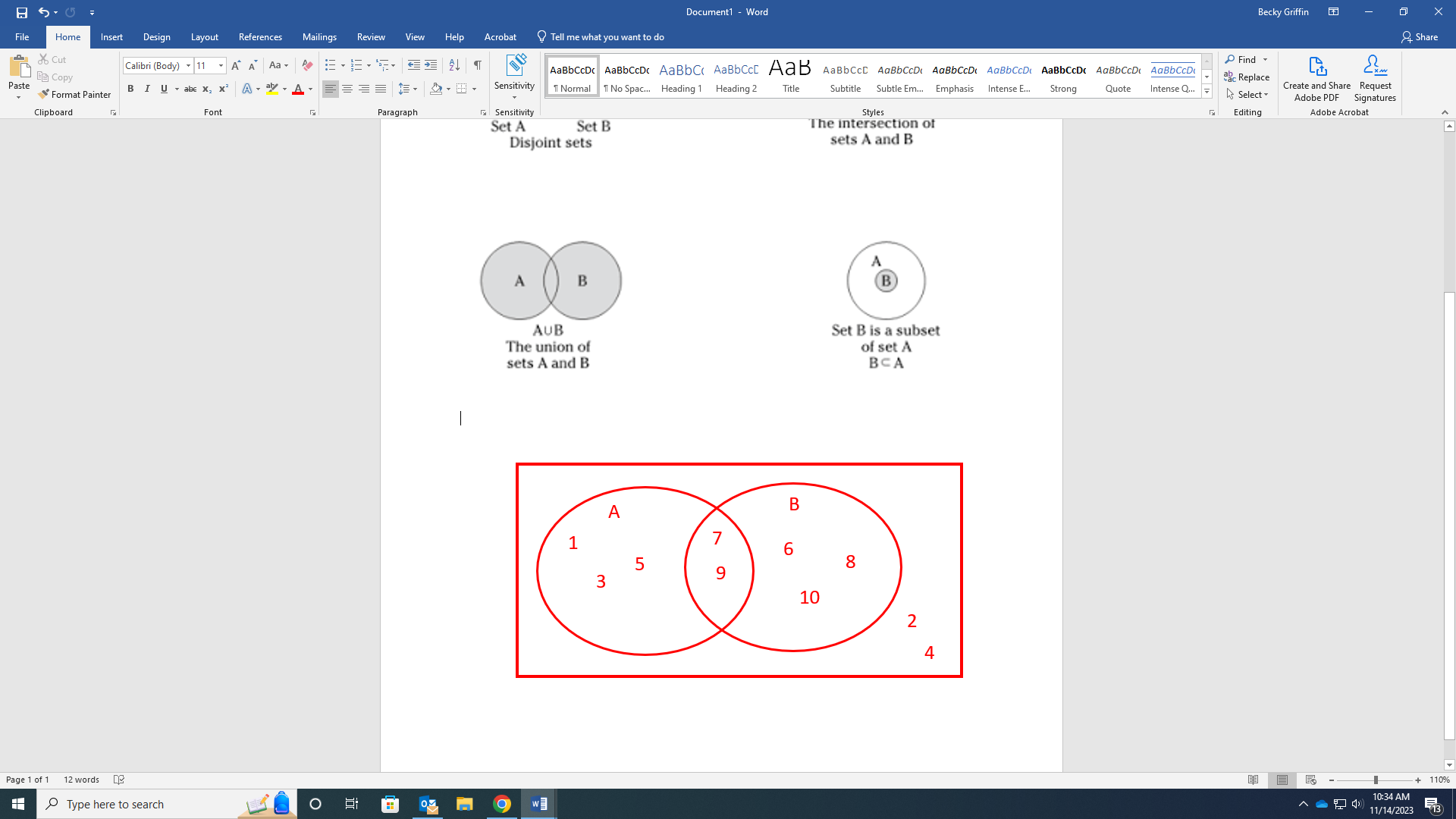
Set B = {6, 7, 8, 9, 10}

overlapping

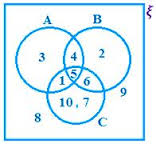
1. Are these sets disjoint, subset, or overlapping?
2. Write the correct symbol that means “5 is an element of Set A”.

5 A

1. Draw a Venn Diagram to represent this problem:



**Example 2:**

[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0CAcQjRw&url=http://www.math-only-math.com/examples-on-Venn-diagram.html&ei=XArAVPHVFoufgwSNooKYDg&bvm=bv.84116906,d.eXY&psig=AFQjCNG27KRNXAyMT2Y1e4YPZYgjOVb4WQ&ust=1421958094972646)

Name the elements in the given sets:

1, 3, 4, 5

1. Set A = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1, 5, 6, 7, 10

1. Set C = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2, 6, 7, 8, 9, 10

1. A’ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5, 6

1. B C = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B = 2, 4, 5, 6 C = 5, 6, 7, 1, 10 overlapping

1, 2, 4, 5, 6, 7, 10

1. B C = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Union = All

1, 4, 5, 6, 7, 10

1. (A  B)  C = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A intersect B = 4, 5 union with C = 5, 6, 7, 1, 10

**Example 3:**

Set A = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

Set B = {2, 4, 6, 8, 10}

Set C = {1, 3, 5, 7, 9}

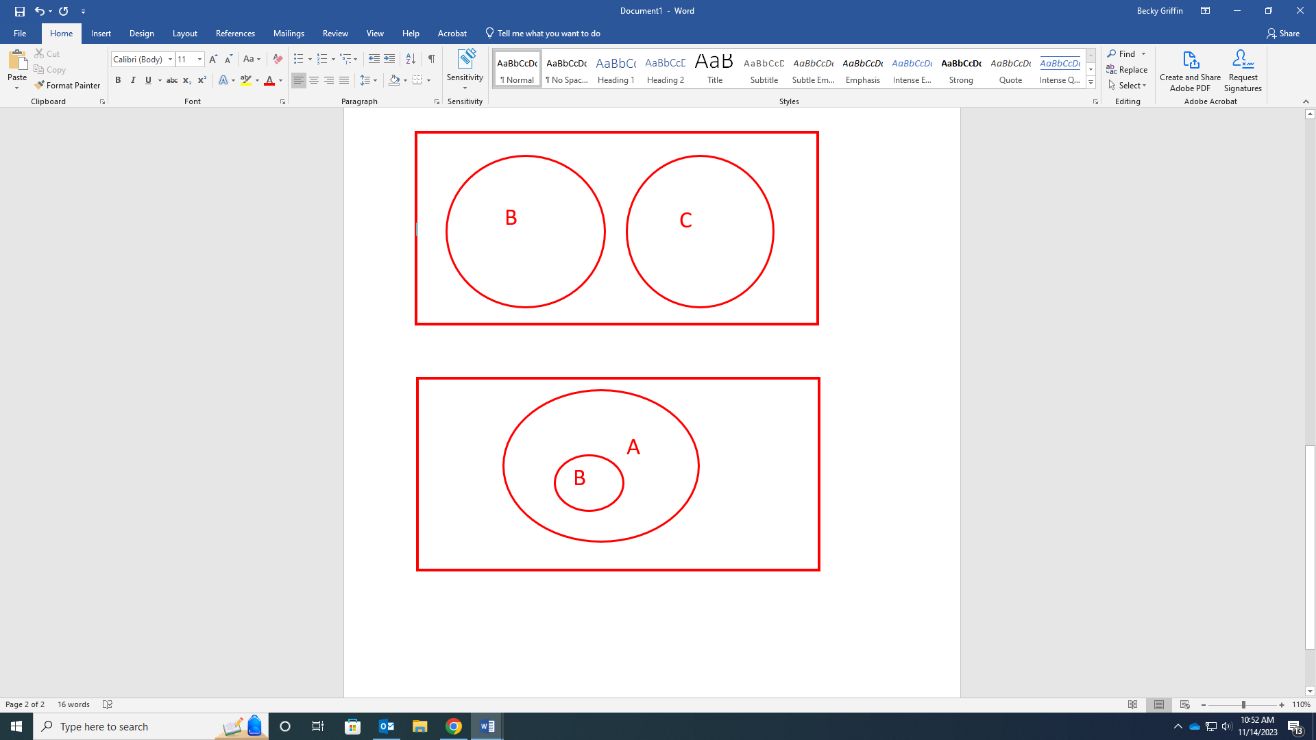
Set D = {1, 2, 3, 4, 5}

1. Set A and Set B

Subset

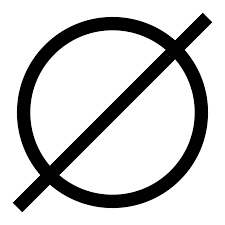
1. Subset, disjoint, overlapping?

B  A

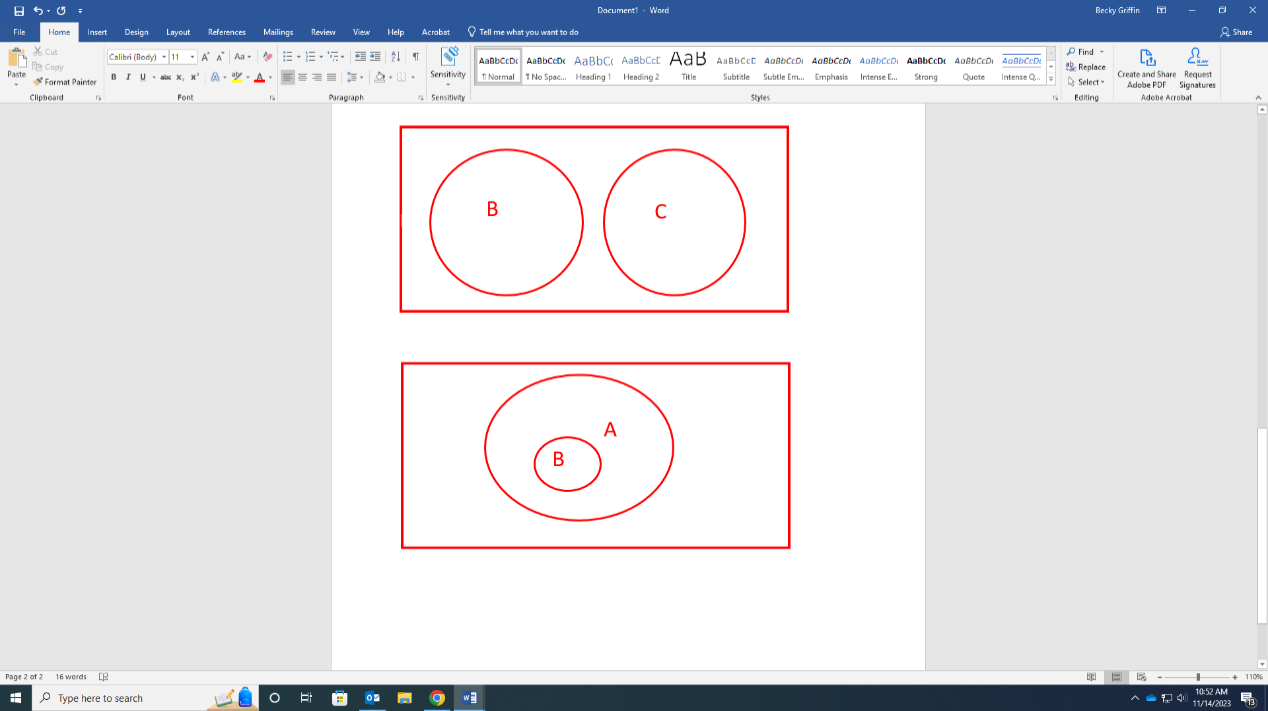
1. Write the correct symbol.
2. Draw a picture.
3. Set B and Set C

Disjoint

1. Subset, disjoint, overlapping?

B  C

1. Write the correct symbol.

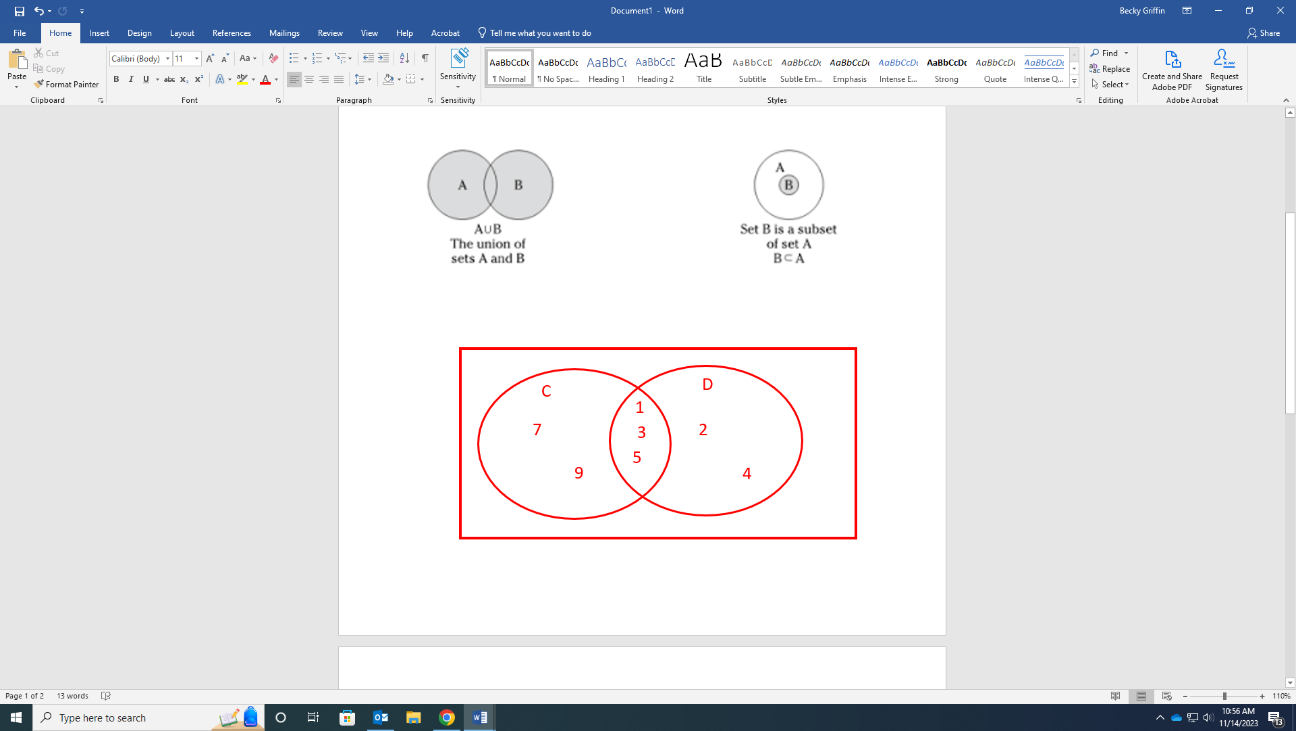


1. Draw a picture.
2. Set C and Set D

Overlapping

1. Subset, disjoint, overlapping?

C  D

1. Write the correct symbol.
2. Draw a picture.
3. Write the element(s) in the set C D

1, 3, 5

1, 3, 5, 7, 9

1. Write the element(s) in B’.

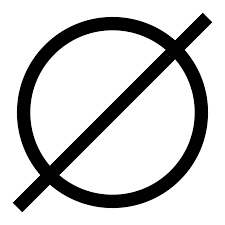
7, 9

1. Write the element(s) in C D’.

C=1, 3, 5, 7, 9 D’=6, 7, 8, 9, 10

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

1. Write the element(s) in B C.

 empty set, null set

1. Write the element(s) in B C.

1, 2, 3, 4, 5, 7, 9

1. Write the element(s) in C D.

**Sets of Numbers:**

Natural

Whole

Integers

Rational

Irrational

Real

counting numbers

{1, 2, 3, 4, …}

N

0 and counting numbers…..Start with 0

{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

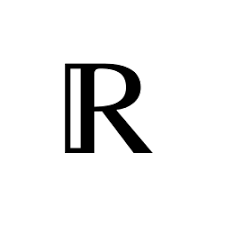
any number that cannot be expressed as a fraction



I

R

ALL numbers, rational and irrational

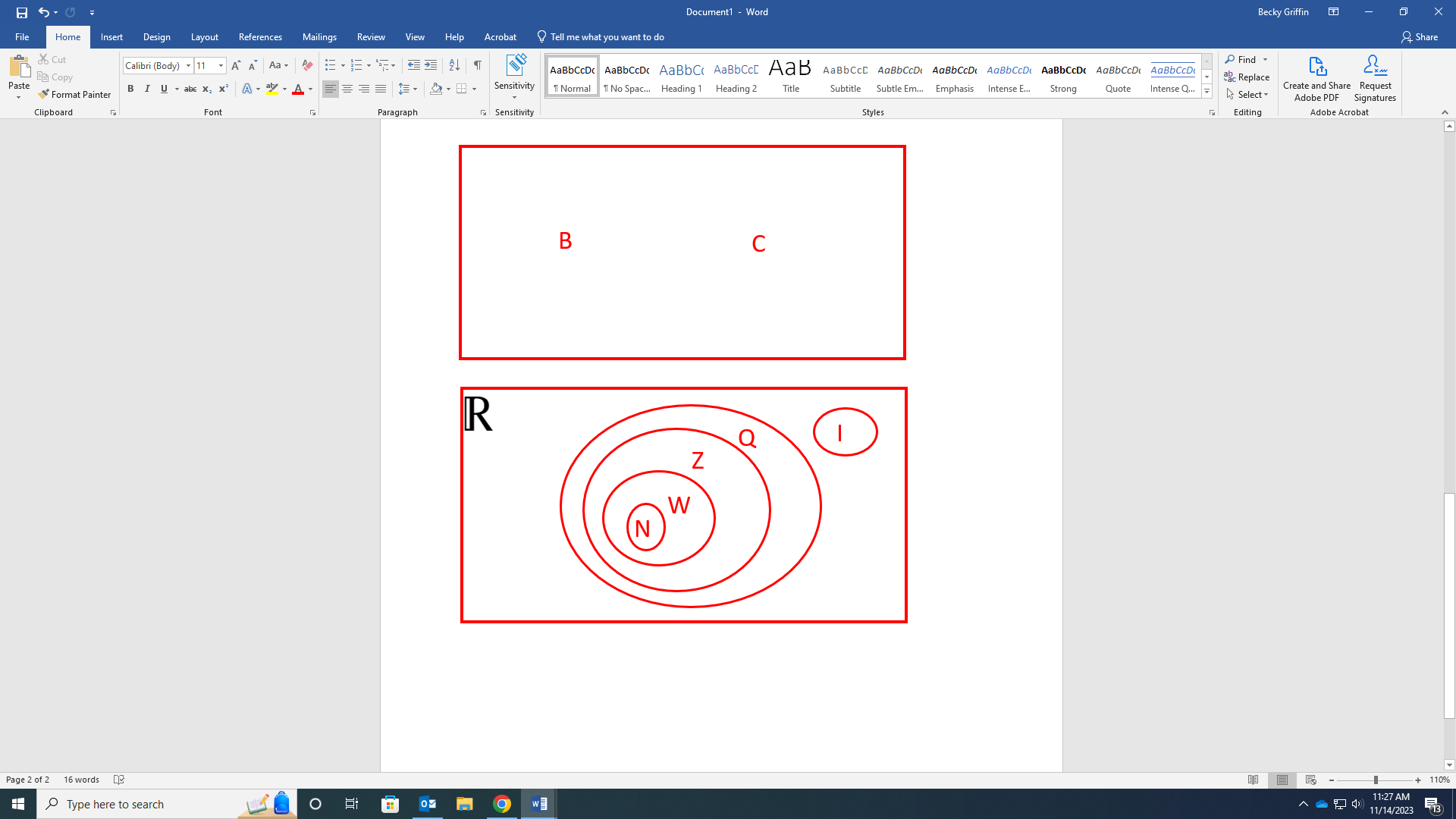
Symbol: 

<https://pressbooks-dev.oer.hawaii.edu/math111/chapter/introduction-2/>

**Draw a Venn Diagram** **Example:** Identify the set(s)

to represent these sets of Numbers: of numbers to which each

given number belongs:



Z Q R

1. -8

I R

1. 
2. 

N W Z Q R

Q R

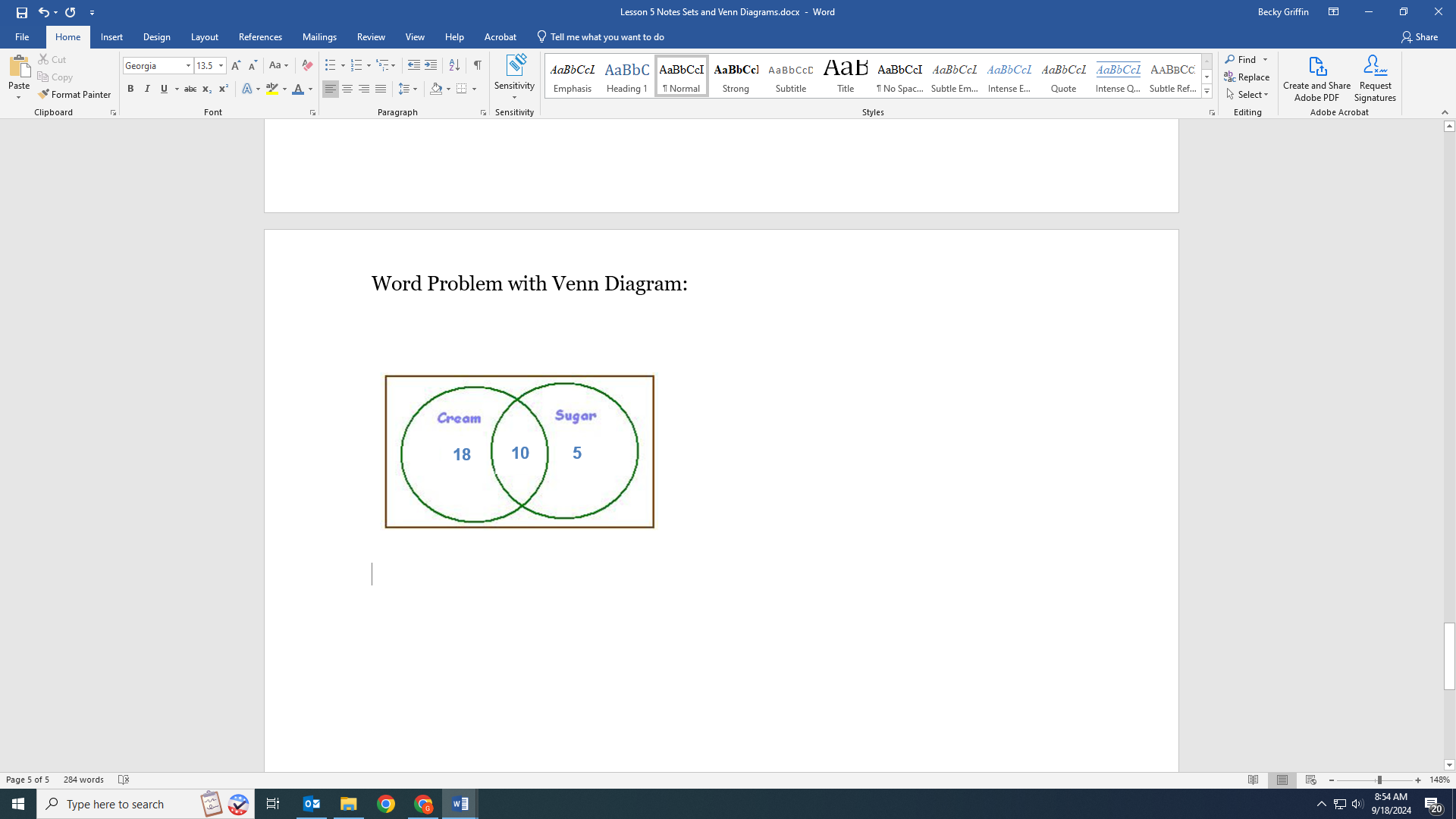
1. 

W Z Q R

1. 0

**Word Problem #1 with Venn Diagram:**

A survey asked 60 coffee drinkers whether they like cream or sugar in their coffee. According to the Venn diagram below, how many like:



28

a) Cream?

15

b) Sugar?

5

c) Sugar but not cream?

d) Cream but not sugar?

18

e) C S (Cream and sugar)?

10

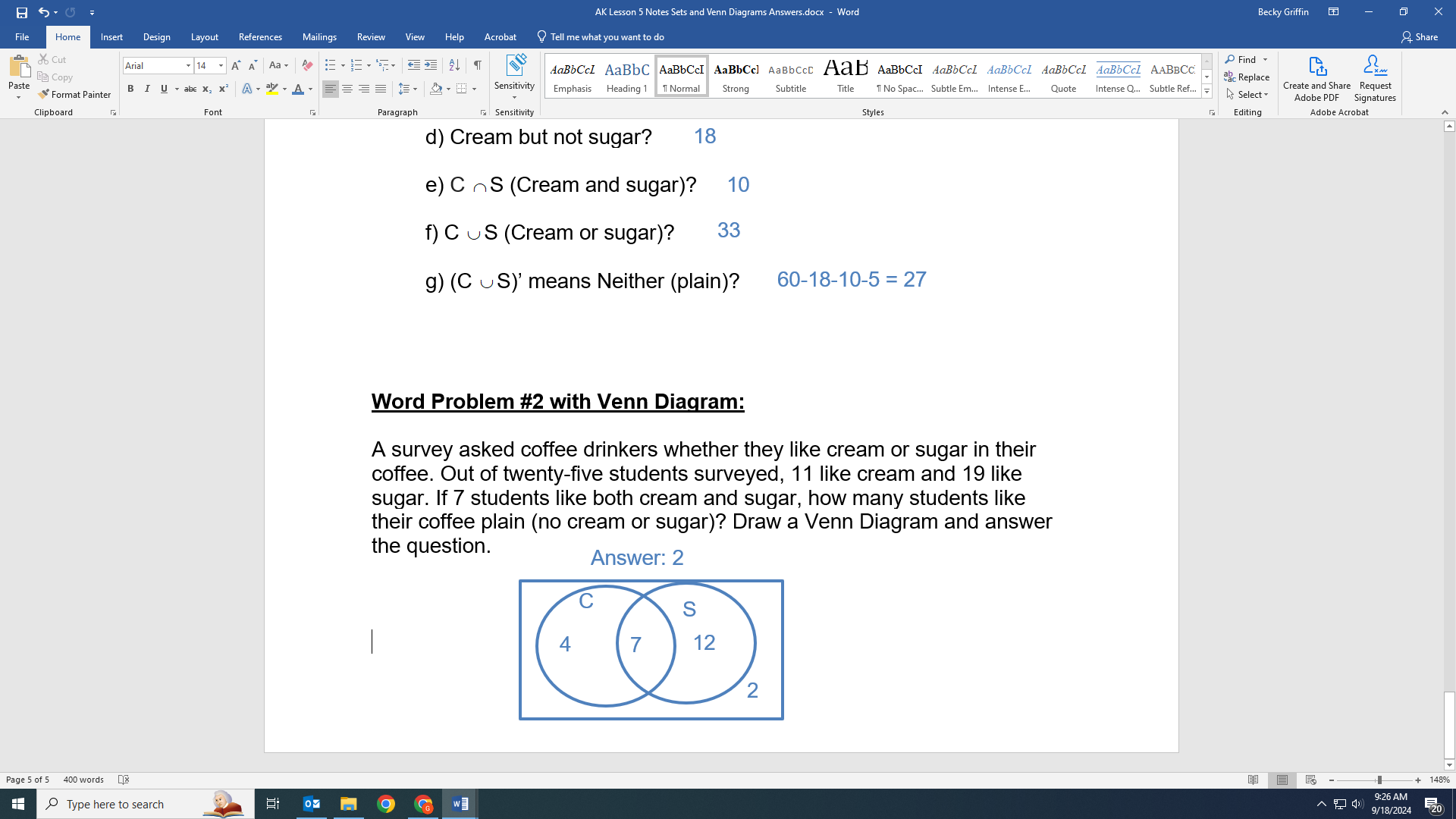
33

f) C S (Cream or sugar)?

60 - 18 - 10 - 5 = 27

g) (C S)’ means Neither (plain)?

**Word Problem #2 with Venn Diagram:**

A survey asked coffee drinkers whether they like cream or sugar in their coffee. Out of twenty-five students surveyed, 11 like cream and 19 like sugar. If 7 students like both cream and sugar, how many students like their coffee plain (no cream or sugar)? Draw a Venn Diagram and answer the question.