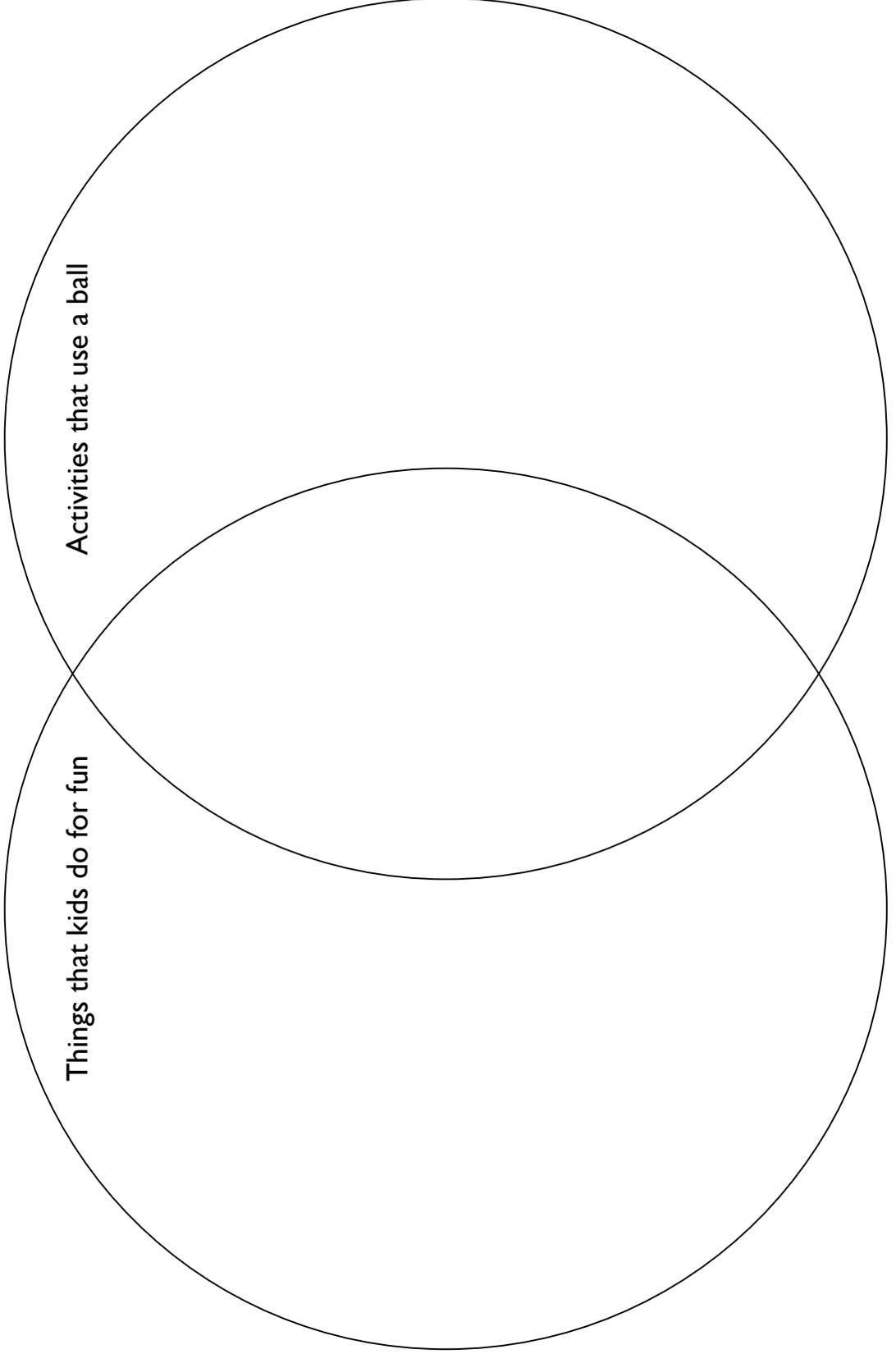**Algebra 2**

DATE:

Unit 1, Lesson 1: Classification and The Real Number System
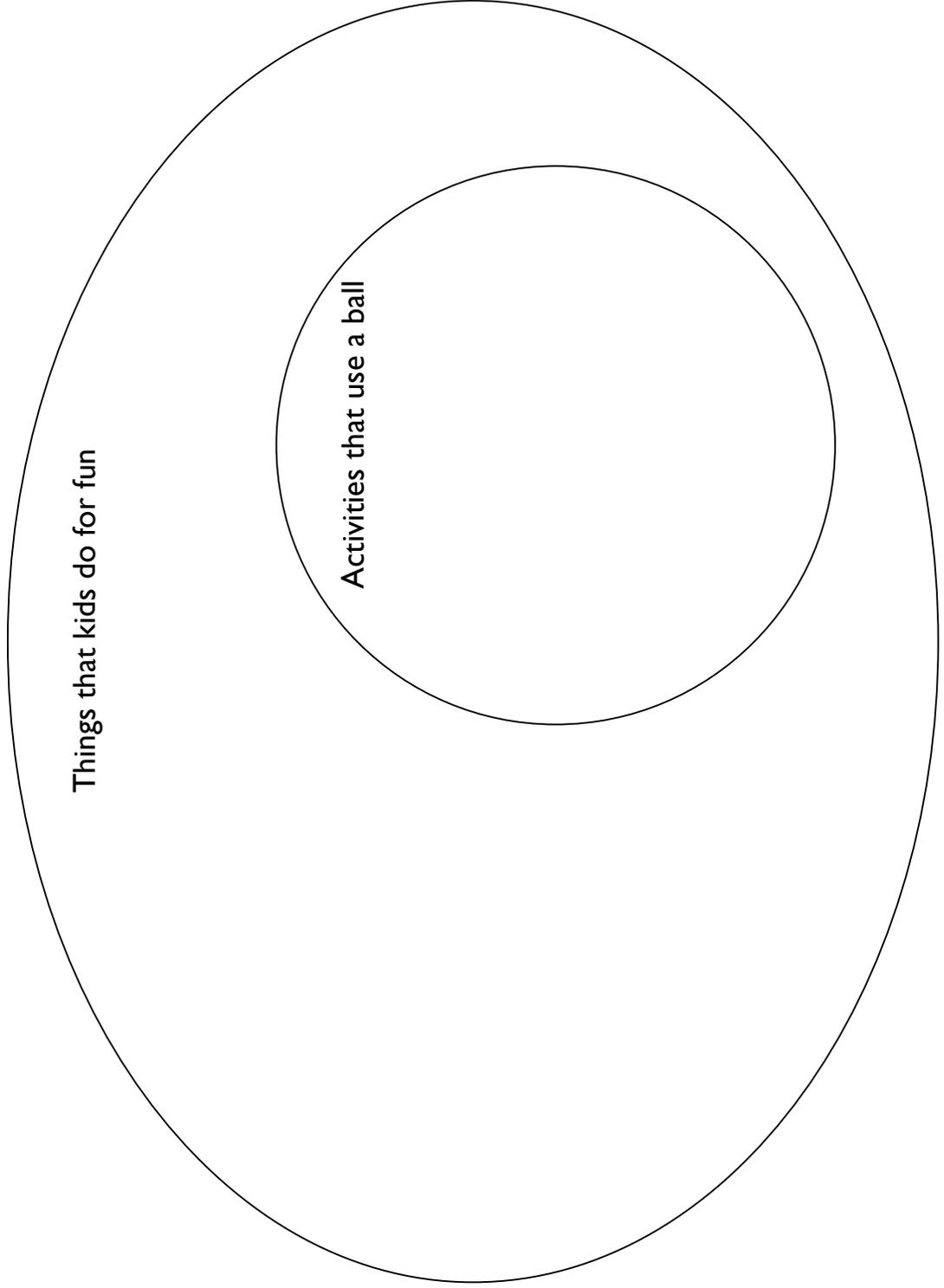
Objectives	
- Make correct logical statements about elements classified in a Venn Diagram	

Materials and Handouts	Homework
- Venn Diagrams 1 – 2 (one per group) - Venn Diagrams 1 – 2 question transparencies - Classification practice handout - Sets of cards with numbers - Transparencies for number system activity - Classifying real numbers / understanding real numbers & answer transparencies - Homework 1-1: Classifications and Mastering the real number system	#1-1 1) Classification and Mastering the Real Numbers

Time	Activity
15 min	**Welcome** - No homework - Course Expectations - E-mail addresses, g-mail addresses
20 min	**Group Work: Classification** - For this activity, we need a **team-captain**. Today, that will be whoever's birthday is coming up soonest. - Hand out **Venn Diagram #1** to each group. Put a set of elements on the overhead. Ask groups to write down each element once on the diagram, deciding where it best fits. In this case, all the elements fit within one circle, so they form a **subset.** Show the **alternate form of Venn Diagram #1** on the overhead. - Students should flip to the other side to see **Venn Diagram #2.** Repeat the process. - Hand out the **Classification Practice** sheet to each student to work on. This should be done individually, but group members may ask each other for help.
30 min	**Developing understanding of the number system** - Give each group a set of cards that each have a single number on them (cards attached) - On the overhead, show the text: "**Whole Numbers**". Ask students to find all their cards that have this kind of number, and to put them in the middle. - On the overhead, show the text: "**Integers**: positive and negative whole numbers". Students should identify the cards that are integers, and put them in the center. - Now we will begin to develop the number system diagram on the board. Tell students that we want to organize whole numbers and integers with a Venn Diagram. On the overhead, show the text: "**Rational Numbers:** numbers that **can be** expressed as a fraction in the form $\frac{p}{q}$ where p and q are both integers, and $q \neq 0$." Clarify what this means. Ask students to identify their rational number cards and place them in the middle. Refer back to the numeracy skill builder if students forget to include whole numbers and decimals. - Based on this, call on a student to add the rational numbers circle to the diagram on the board. - On the overhead, show the words "**Irrational Numbers:** numbers that **cannot be** expressed as a fraction in the form $\frac{p}{q}$ where p and q are both integers, and $q \neq 0$." Ask

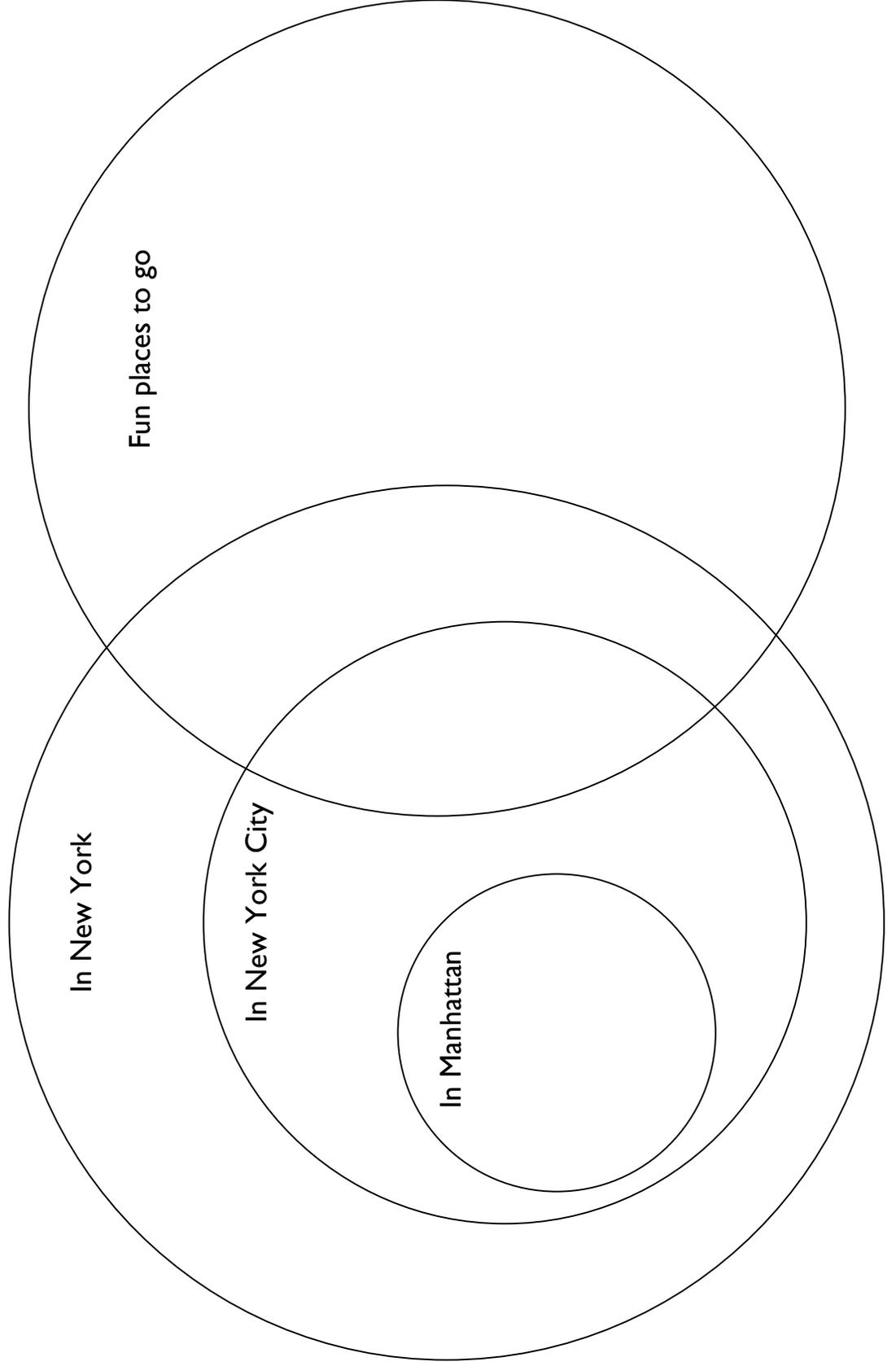| | students to identify these numbers on their cards. They should realize that it is all the numbers that they have not already put in the center. |
	- Based on this, call on a student to put the irrational number circle on the board. With discussion, the class should understand that this circle must be mutually exclusive.
	- Explain that these numbers together are considered **real numbers**; draw in a final circle to complete the diagram.
	- Write all the numbers from the cards in the correct location on the completed Venn Diagram.
	- Hand out the **Classifying Real Numbers** practice sheet. Give students a few minutes to complete it and then review answers on the overhead.
15 min	**Individual Practice** - Students should complete the **Understanding Real Numbers** worksheet. Review on the overhead if time permits.

5 min	**Closure**
	Students:
	    o Write down notes template in their logs/planners
	    o Write down practice sheet and answer key in their logs/planners
	    o Write down homework in their logs/planners

Venn Diagram #1

Activities that use a ball

Things that kids do for fun

Venn Diagram #1 – Alternate Form

Things that kids do for fun

Activities that use a ball

Venn Diagram #2

Fun places to go

In New York

In New York City

In Manhattan

Venn Diagram #1 Elements

Write each item on the diagram exactly one time. Discuss where to put each one, and the recorder will write it down.

1) Baseball
2) Tag
3) Hockey
4) Soccer
5) Video Games
6) Bowling
7) Jumping rope
8) Basketball
9) Prank phone calls
10) Homework

Venn Diagram #2 Elements

Write each item on the diagram exactly one time.
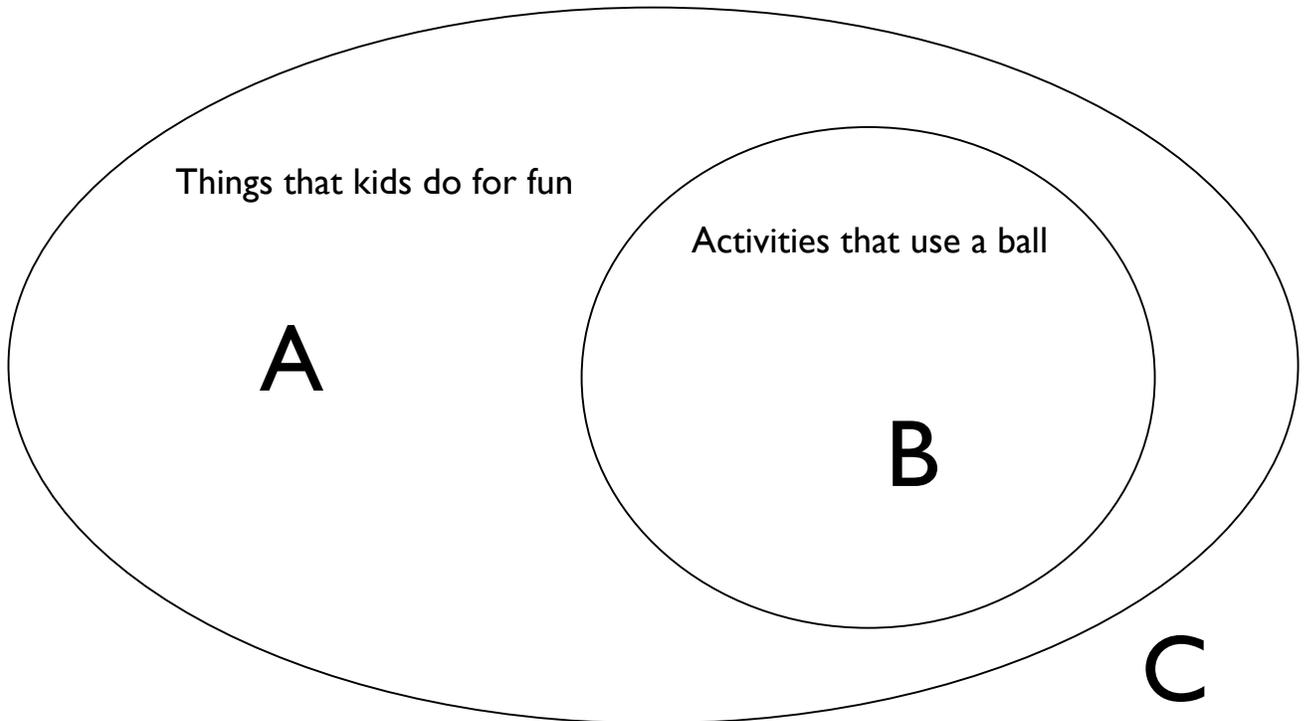Discuss where to put each one, and the recorder will
write it down.

1) The Empire State Building
2) Brooklyn Bridge
3) Algebra 2 class
4) Times Square
5) Annex Antique Fair & Flea Market
6) Vietnam War Memorial in DC
7) Your dentist's office
8) Miami
9) A club in New York City
10) Disneyworld

Venn Diagram #1 Questions

Things that kids do for fun

Activities that use a ball

A

B

C

True or False? Which section supports your answer?

1) Some sports that use a ball are not fun for kids.

2) All fun things that kids do use a ball.

3) All sports that use a ball are things that kids do for fun.

4) Activities that don't use a ball must be fun for kids.

Venn Diagram #2 Questions

In New York

Fun places to go

C

In New York City

E

B

F

Manhattan

D

A

G
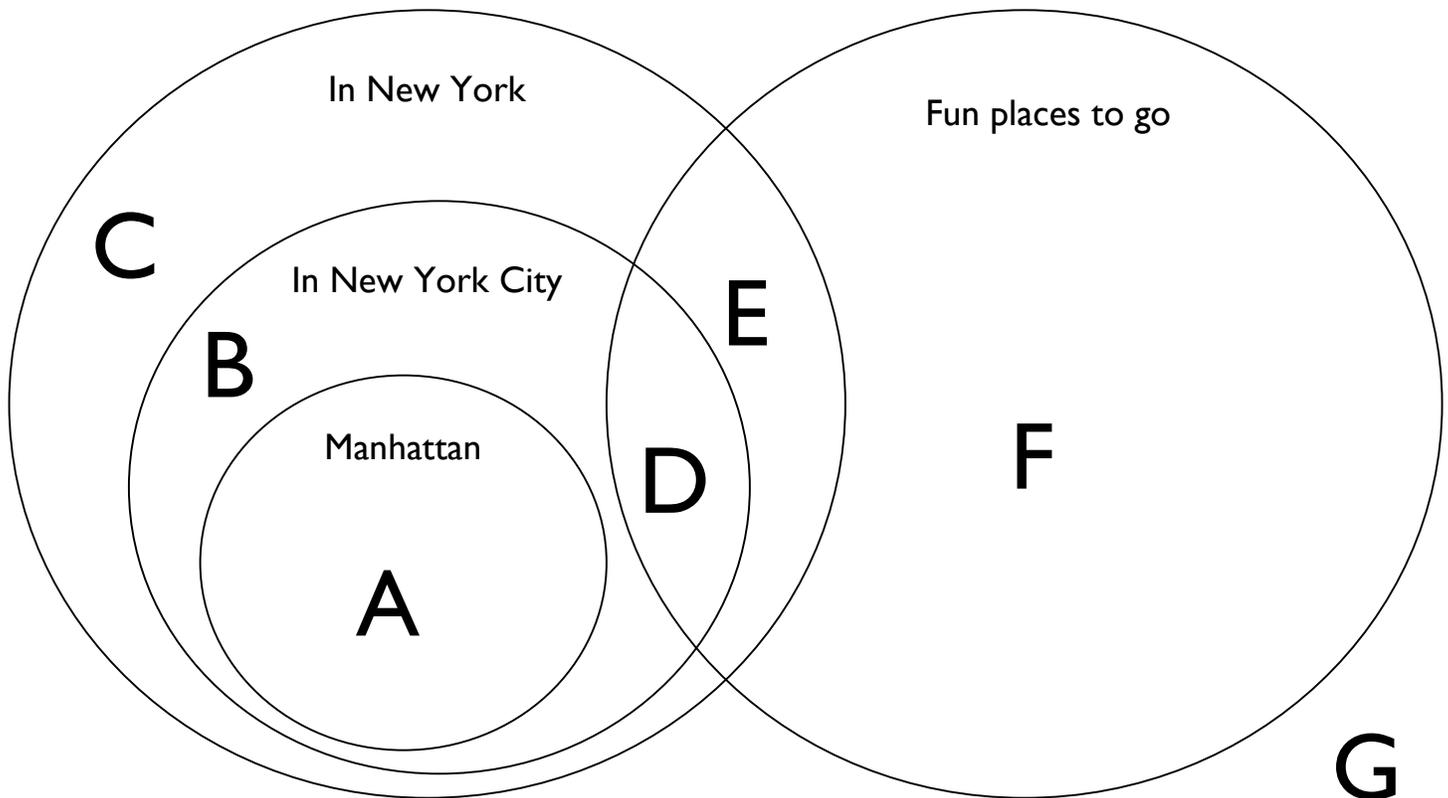
True or False? Which section supports your answer?

1) If something is in Manhattan, then it is in New York.

2) All fun places to go in New York are in New York City.

3) Some places in New York City are not fun.

4) If someone is in New York City, they are at Manhattan.

What does this diagram say about fun and Manhattan?

Algebra 2   **Section:**   **Name:**
Unit 1, Lesson 1: Classwork 1-1

# Classification Practice

Directions:

Say if each statement is true or false. Then, indicate which part(s) of the Venn Diagram supports your answer.

Venn Diagram #1:

1) All Zoinks are Boops.

2) Some Boops are not Zoinks.

3) If you're a Boop, then you're a Zoink.

4) Some Zoinks are not Boops.

5) If you're not a Zoink, you're not a Boop.

6) If you're not a Boop, you're not a Zoink.

Zoinks

Boops

A   C

B

Venn Diagram #2:

Larps

E

D

Zaps

A

Zooms

B

F

Boings

C
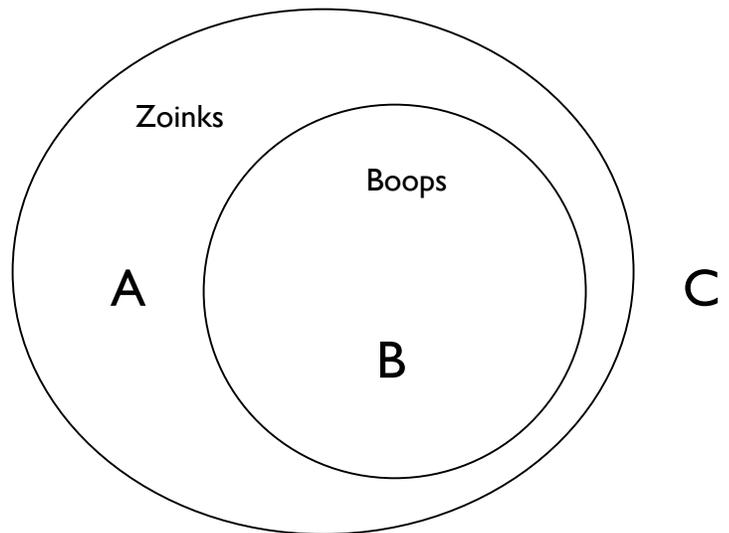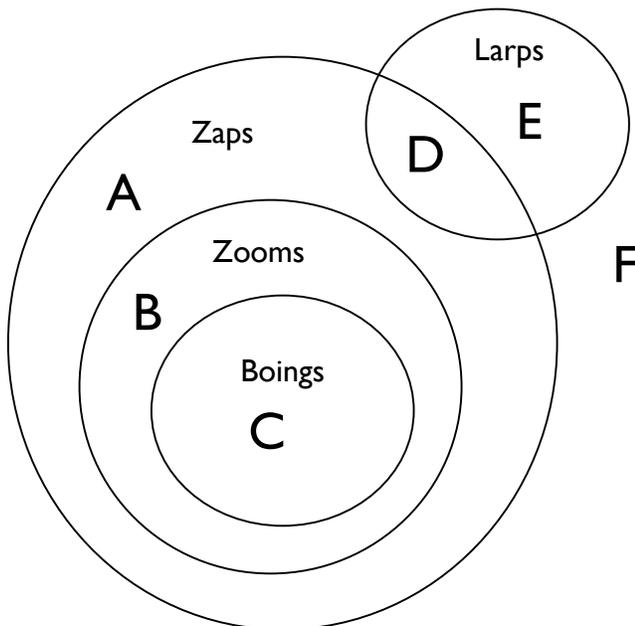
1) All Boings are Zaps.

2) Some Zooms are Boings.

3) Some Larps are Boings.

4) If you're not a Zoom, you're not a Zap.

5) If you're a Zap, you're not a Boing.

6) If you're a Larp, might be a Zap.

7) If you're not a Boing, you're a Zap or a Larp.
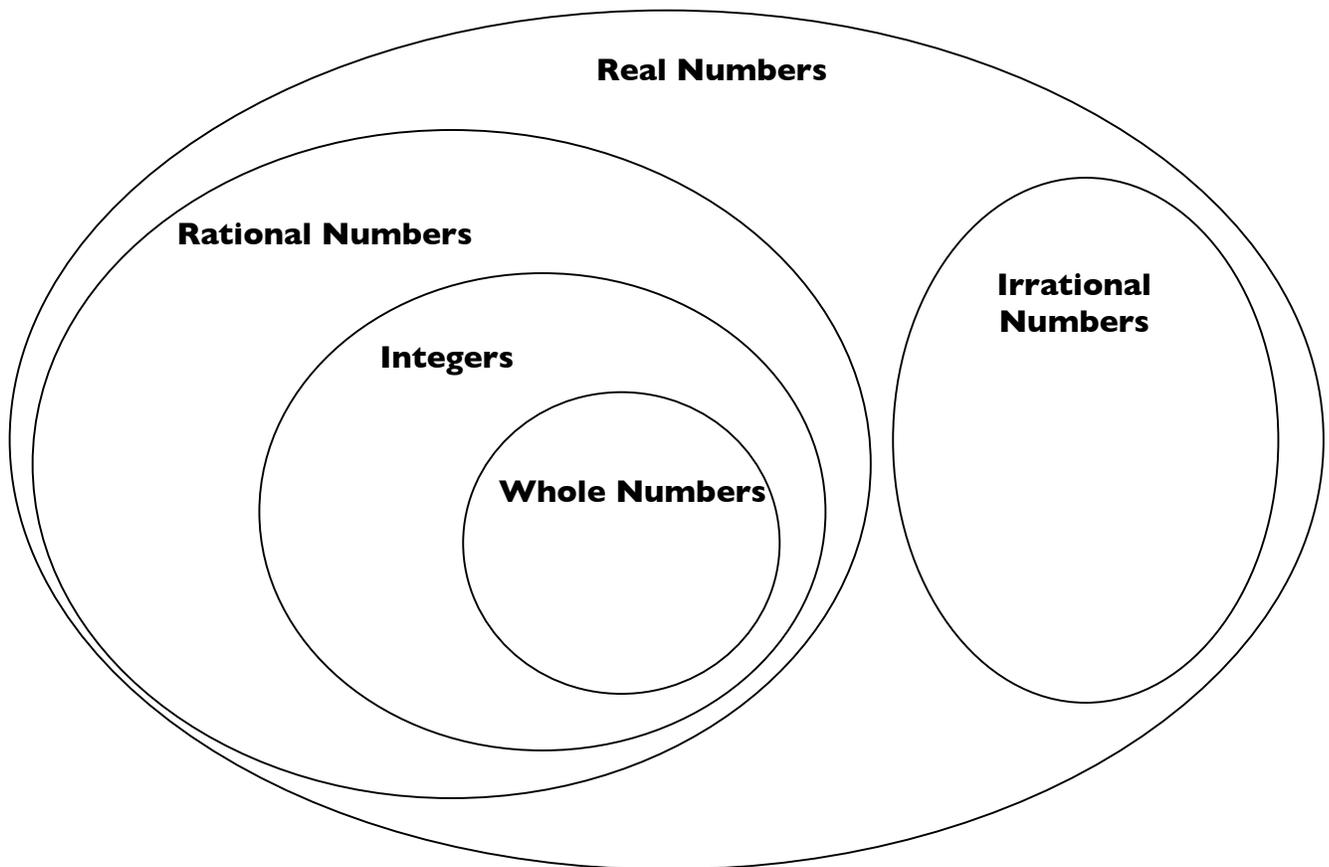
Classifying Real Numbers

Directions:

Write each number in the correct location on the Venn Diagram of the real number system. Each number should be written only once.

$$\left(-6,\quad 2.73,\quad \frac{3}{7},\quad \sqrt{2},\quad \sqrt{9},\quad -100,\quad 0,\quad \pi,\quad 1,\quad -\frac{1}{2},\quad -3.8,\quad 5.\overline{42},\quad 8.293017...\right)$$

Real Numbers

Rational Numbers

Irrational Numbers

Integers

Whole Numbers

True or false? If false, explain why.

1) All whole numbers are integers.

3) Some rational numbers are integers.

2) All integers are whole numbers.

4) Some whole numbers are irrational numbers.

Understanding Real Numbers

1) List the numbers in the set $\left(\dfrac{4}{5}, \ -18, \ 0, \ \sqrt{5}, \ -\dfrac{1}{2}, \ -2.01, \ 5, \ \pi, \ 2.\overline{513}, \ 5.1823159... \right)$ that are:

   Whole numbers

   Integers

   Rational numbers

   Irrational numbers

   Real numbers

2) Put a check mark for **each set** that the number is a part of:

	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Real Numbers
-7					
¾					
$\sqrt{2}$					
5					
0.398					

3) True or false? If false, explain why.

   a. All **integers** are **rational**.

   b. If a number is **rational**, then it must be a **whole number**.

   c. Some **irrational numbers** are **integers**.

   d. All **irrational numbers** are **real numbers**.

   e. No **whole numbers** are **integers**.

# More Classification and Real Numbers Practice

Directions:

Say if each statement is true or false. Then, indicate which part(s) of the Venn Diagram supports your answer.

Venn Diagram #1:

1) If you're a Woof, you're an Arf.

2) All Arfs are Woofs.

3) If you're not an Arf, you're not a Yip.

4) Some Woofs are Yips.

5) If you're not a Woof, you must be an Arf.

6) All Yips are Arfs.

7) If you're an Arf, you're a Yip.
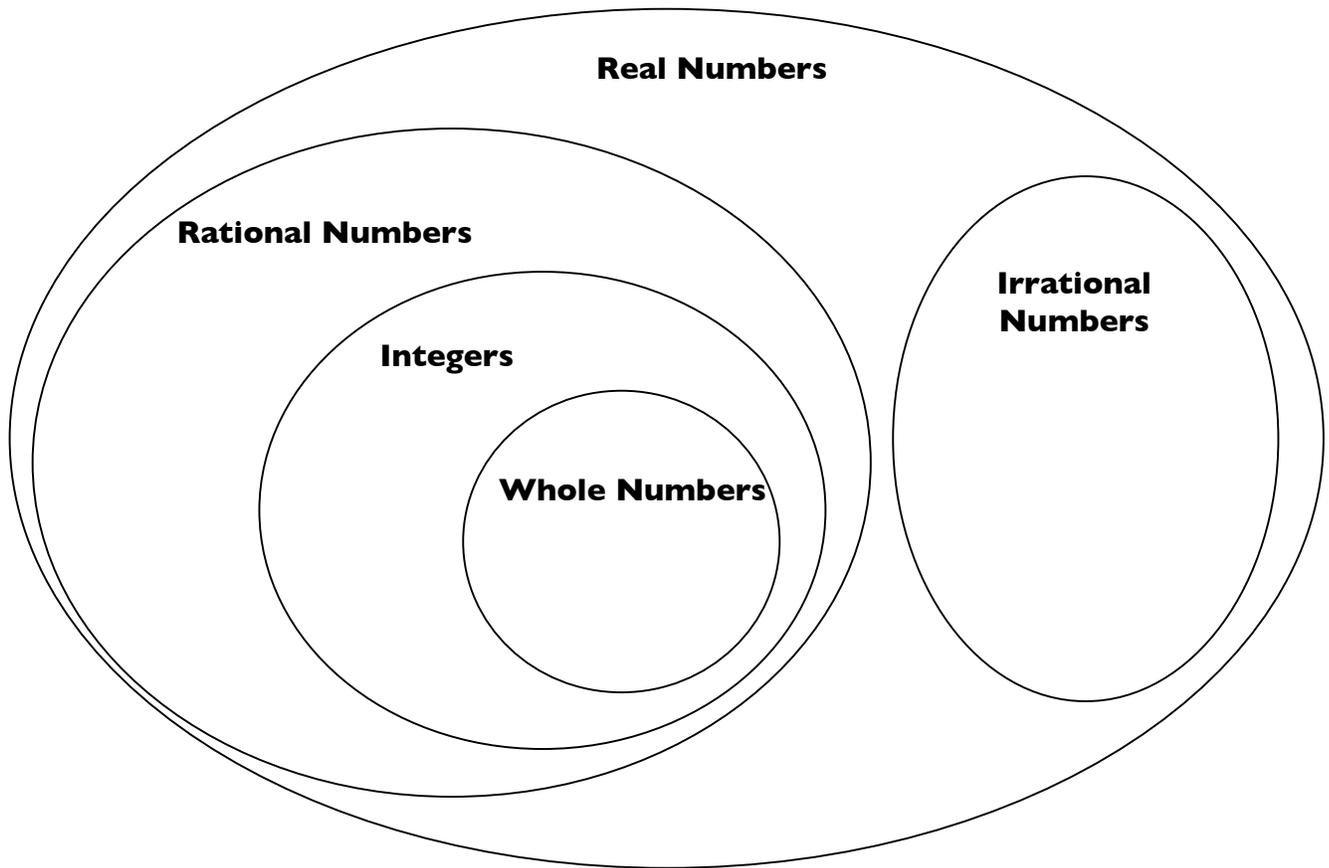
8) If you're not a Yip, you might be a Woof.
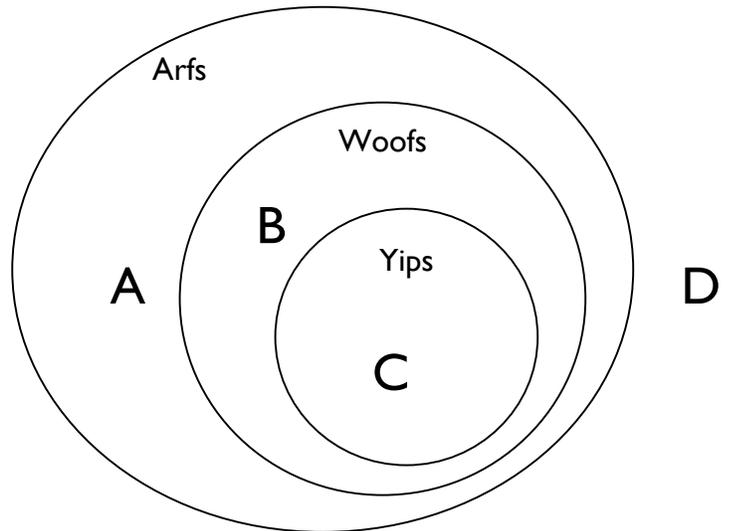
Venn Diagram #2:
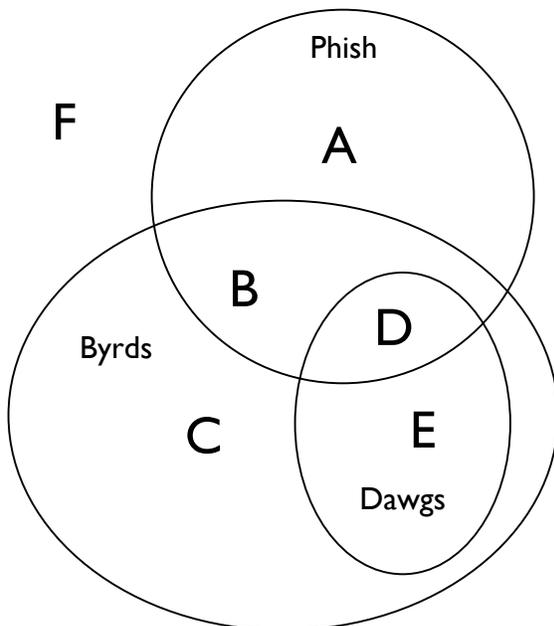
9) Some Dawgs are Phish.

10) All Byrds are Dawgs.

11) All Dawgs are Byrds.

12) If you're not a Phish, you must be a Byrd.

13) No Phish are Byrds.

14) All Dawgs are Phish.

15) If you are both Phish and Byrd, you must be a Dawg too.

16) Some Dawgs are not Byrds.

17) Write each number in the correct location on the Venn Diagram of the real number system. Each
number should be written only once.

$$\left(3, \quad 2.09824..., \quad \sqrt{25}, \quad \sqrt{24}, \quad \frac{2}{5}, \quad -100, \quad -7, \quad \pi, \quad -\frac{2}{5}, \quad 6.5, \quad -3.\overline{01}, \quad 3\frac{2}{7} \right)$$

Real Numbers

Rational Numbers

Irrational Numbers

Integers

Whole Numbers

18) List the numbers in the set $\left(-17, \quad 0, \quad \sqrt{3}, \quad -\frac{1}{6}, \quad \frac{5}{7}, \quad 7.99, \quad 8, \quad \pi, \quad 0.03986..., \quad 0.\overline{53} \right)$ that are:

Whole numbers

Integers

Rational numbers

Irrational numbers

Real numbers

19) True or false? If false, explain why.

a.   Some **irrational numbers** are **integers**.

b. All **rational numbers** are **whole numbers.**

c. If a number is **not** an **integer**, then it is **not** a **whole number**.

d. If a number is **not** an **integer**, then it is **not** a **rational number**.

e. Some **irrational numbers** are **not real numbers**.

f. No **rational numbers** are **integers**.

20) Put a check mark for each set that the number is a part of:

	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Real Numbers
0					
2.07					
-35					
$\sqrt{7}$					
$\dfrac{7}{3}$					

21) Write each number in **fraction** form.

-25	7	0.25	2.913
$3\dfrac{5}{7}$	0.002	$8\dfrac{1}{9}$	0.5555...

Integers

Positive and negative whole numbers

Rationals

Numbers that **can** be written in the form $\frac{p}{q}$ where **p** and **q** are **integers** and **q** $\neq 0$

Irrationals

Numbers that **cannot** be written in the form $\frac{p}{q}$ where **p** and **q** are **integers** and **q** $\neq 0$

7	-5	0.222...	$\frac{3}{4}$
0	-1	$0.\overline{45}$	7.02189...
199	0.5	$5\frac{2}{9}$	π
-32	3.21	$\frac{11}{5}$	$\sqrt{12}$