

Agenda:

- 1) Bell Ringer- make flash cards for rational, irrational, real, and imaginary numbers
- 2) Go over homework
- 3) Unit 1: Lesson 2: Number Systems
What are the other number systems?
- 4) Homework: lesson 2 (p. 13-14)

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Number Systems

Real Numbers Imaginary Numbers
Rational or Irrational

RATIONAL NUMBER:

- A NUMBER THAT CAN BE EXPRESSED AS A FRACTION (RATIO), THIS INCLUDES ALL INTEGERS
- CAN BE EXPRESSED AS TERMINATING OR REPEATING DECIMALS
- Examples: 10, $\frac{1}{4}$, -5, .25, 0, .3333333...

IRRATIONAL NUMBER:

- A NUMBER THAT CANNOT BE EXPRESSED AS A FRACTION (RATIO)
- DECIMALS THAT NEVER END AND NEVER REPEAT
- EXAMPLES: π , $\sqrt{3}$, $\sqrt{7}$, $\sqrt{14}$, $-\sqrt{21}$

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INTEGERS: POSITIVE AND NEGATIVE WHOLE NUMBERS AND ZERO
...-3, -2, -1, 0, 1, 2, 3,

WHOLE NUMBERS: COUNTING NUMBERS AND ZERO
0, 1, 2, 3, 4,

COUNTING NUMBERS: (NATURAL NUMBERS): 1, 2, 3, 4,

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Practice:

- 1) Which whole number is an integer that is neither positive or negative?
- 2) Look at the following list of numbers:
-3, $\frac{1}{4}$, -1, 0, 1, 2, 0.3, $\sqrt{4}$, $\sqrt{12}$, $-\frac{3}{4}$

Which of the numbers are integers?

Which of the numbers are rational?

Which of the numbers are whole?

Which of the numbers are counting?

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- 3) What is the difference between a rational number and an integer?
- 4) Is $\frac{3}{4}$ an integer? Why or why not?
- 5) Give an example of an irrational number and tell how you would use the number.
- 6) Give an example of a number that is real, rational, and an integer, but not a whole number.

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Lesson 2-the Number Systems

I can:


- ✓ Identify the number systems
- ✓ Place a number in the correct number system(s)
- ✓ Place numbers correctly on a number line.

Example 1: What are the numbers on this number line?

The name for this number system is the (natural) counting numbers

These numbers begin with 1 and end with ∞ .

REAL LIFE EXAMPLES:
anything that we can't birthday



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REAL LIFE EXAMPLES:

Example 2: What numbers should be labeled here?

Expanding the set from example 1 by one number creates a new number system called the

These numbers begin with 0 and end with ∞.

whole numbers

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Real Life Examples: \$, grades, your pocket

Example 3: Now that we've expanded our number line, what numbers have we included?

This number set is called the integers and it includes the negatives.

These numbers begin with -∞ and end with ∞.

Real Life Examples: temperature, debt, golf, elevators, sea level

Are there any numbers we have not yet placed on our number lines?

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Examples: $\frac{1}{2}$, 3.5, $2\frac{1}{4} = 2.25$

Vocabulary: decimals that terminate (End)

Examples: $\frac{1}{3}$, $2\frac{2}{3}$, $-\frac{8}{2}$, $.3$, $2.\bar{6}$, $-.8$

Vocabulary: decimals that repeat

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This number set is called the rational numbers (fractions & decimals (repeating, terminating))

and it includes

Real Life Examples:

Lastly, the number system that includes non-terminating non-repeating decimals is called the irrational number system.

Some examples are: π , $\sqrt{20}$, $\sqrt{5}$, $-\sqrt{5}$

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This number set is called the _____

and it includes _____

Real Life Examples:


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Lastly, the number system that includes _____, _____ decimals is called the _____ system.

Some examples are _____

All the numbers we know make up what is called the Real Number System

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Let's Practice!

To which number system(s) does each number belong?

1) -9

Real
Rational
Integer

2) $\frac{3}{5}$

R
R

3) 0

whole
integer
real
rational

4) $3.\overline{458}$

real
rational

5) 24

Real
Integer
Whole
Rational
Natural

6) $8\frac{1}{3}$

Real
Rational

7) -9.25

Rational

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Tell whether each decimal is repeating or terminating and justify your answer.

6) 7.1

T

7) $-13.$

T

8) $0.1234512345...$

R

9) $2.373737...$

R

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You do. With a partner, give an example of a number that satisfies these criteria. Be ready to justify your answer.

10. a number that is: real and counting

11. a number that is: real, rational and not an integer

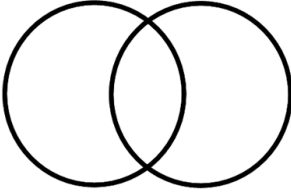
12. a number that is: real, rational, whole, an integer, and natural

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13. Place the numbers in the Venn Diagram. Some numbers may not fit.

-9 0 12 -4 $-\frac{2}{3}$

Integers Whole Numbers



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14. Give a real situation for a number in each number system.

Counting Whole Integers Rational(Decimal) Rational (Fraction)

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Number Systems 2-2 Homework

Name _____

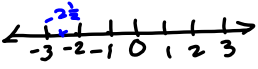
1. What is the first counting number?

2. Mary says whole numbers and counting numbers are the same. Barry disagrees. Who is correct and why?

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3. Is $-\frac{8}{9}$ an integer? Explain your answer.

no - because it's a fraction



4. Give an example of a number that is real, rational and an integer but not a counting number.

-12
0 ← 0

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5. Give an example of a number that is real and rational but not an integer.

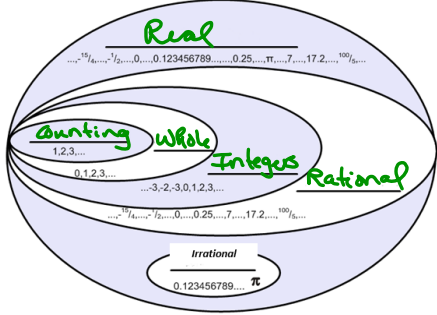
$2\frac{1}{2}$.4 $\frac{2}{3}$ $-\frac{2}{3}$

6. Give an example of a repeating decimal. Explain how you know this number is repeating.

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7. Fill in each blank correctly with one of the numbers systems below.

Counting Numbers Integers Irrational Numbers
Rational Numbers Real Numbers Whole Numbers



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8. Give a real life example of when someone might use a negative integer. Use an example in your explanation.

9. Rate your understanding of this number systems lesson? (Circle One)

☒ Understand ☐ Need Help

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Math 7 – Number Systems Name _____
Lesson 2 – Ordering Numbers, Comparing Numbers, Absolute Value



I can:

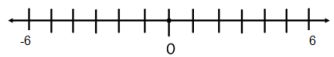
- ✓ Place Numbers On A Number Line
- ✓ Find The Absolute Value Of A Number
- ✓ Compare All Kinds Of Numbers.

Having a good “feel” for numbers and where they belong on a number line is very important. Let’s take a few minutes to look at placing numbers on a number line.

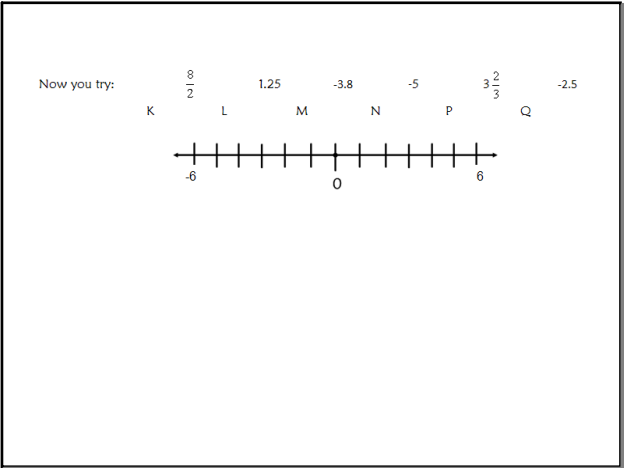
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Examples. Given the following numbers, place them on their correct position on the number line with a dot and their corresponding letter.

-1	$2\frac{1}{2}$.5	-4.5	5.3	$-\frac{7}{2}$
A	B	C	D	E	F



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Let's Write: How did you know where to put -3.8 on the number line?

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Now that we have an understanding of where numbers fall on the number line, let's talk about their *ABSOLUTE VALUE*.

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Absolute Value –

Mark each person's location.

(M) Megan lives 20 miles West of school.

(J) Jake lives 10 miles North of school.

(B) Bob lives 20 miles East of school.

(S) Sarah lives 30 miles South of school.

- 1) Who lives the furthest from school?
- 2) Who lives the closest to school?
- 3) Does Bob or Megan live closer to school? Explain your answer.

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Let's look at the directional arrows like number lines. Mark each point again.

Name	Integer		Absolute Value
Megan			
Jake			
Bob			
Sarah			

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You do. Simplify each expression.

1. $|-7|$ 2. $|10|$ 3. $|-13|$

4. A bird and a man are on a 33-foot diving platform. The bird takes off and flies 33 feet up to the ceiling. The man dives off the platform into the water and then comes to the surface. Which one is farther from the platform? Justify your answer.

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1-2 Homefun: Ordering Numbers, Absolute Value
Name _____

1. Given the following numbers, place them on their correct position on the number line with a dot and their corresponding letter.

$\frac{2}{3}$

A

$-2\frac{1}{2}$

B

3.5

C

-5.25

D

1.3

E

$\frac{7}{2}$

F

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2. Evaluate each of the following.

A. $|9|$

B. $|-11|$

C. $|-2|$

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3. Bill, Will and Phil are friends who live in the same apartment building.

Bill lives 8 floors above Will. Write this number as an integer.

Phil lives 5 floors below Will. Write this number as an integer.

Who lives farther from Will? Justify your answer mathematically.

How far apart do Bill and Phil live? How do you know?

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4. Give an example of a number that is an integer but is not a counting number?

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5. Give a real life example for which you can use the numbers below:

A) -6

B) $4\frac{1}{2}$

C) -28.30

D) 0

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