Agenda:

1) Word Search p.20

2) Unit 1: Lesson 1: Number Systems
What are rational numbers?
irrational numbers?

3) activity

4) Homework: attached worksheet p. 3

Sep 7-12:49 PM

Lesson 1: In this lesson you will learn about number systems and how to classify numbers.

New vocabulary:
- Real number
- Imaginary number
- Rational number
- Irrational number

Real
Rational
Integers
whole
Counting
Irrational
$\pi$
$\sqrt{20}$
Imaginary
$i=\sqrt{-1}$

Sep 5-10:01 AM

Investigation: Using a calculator convert each of the following numbers to decimals or whole numbers.

1) $\frac{7}{8}$ = .875
2) $\frac{1}{2}$ = .5
3) $\sqrt{64}$ = 8
4) $3\sqrt{49}$ = 21
5) $\frac{1}{6}$ = $.1\overline{6}$
6) $\frac{2}{3}$ = $.\overline{6}$

Do you notice any similarities in 1-6?

Rational fraction

1,2 decimals that end (terminate)
3,4 whole numbers
5,6 repeating decimals

Sep 5-10:01 AM

7) $\pi$ 3.141592...
8) $\sqrt{56}$ 7.483314...
9) $3\pi$ 9.424778...
10) $\sqrt{12}$ 3.464101...
11) $\sqrt{99}$ 9.949874...
12) $\frac{\pi}{3}$ 1.04719...

Do you notice any similarities in 7-12?

decimals → never end, never repeat
"not predictable"
irrational

Sep 5-10:01 AM

How are 1-6 different from 7-12?

1-6 → predictable (Rational)
7-12 → unpredictable (irrational)

Sep 5-10:01 AM

What is a rational number?

predictable #
- decimals that end
- decimals that repeat
- whole #s

What is an irrational number?

- $\pi$
- non-perfect squares

crazy, unpredictable decimals

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Both rational and irrational numbers are part of the real number system.
So if rational and irrational numbers are real, what is an imaginary number?

$\sqrt{\text{Negative}}$ $\sqrt{-1} = i$

$i^2 = (\sqrt{-1})(\sqrt{-1}) = (\sqrt{-1})^2 = -1$

$i^3 = (\sqrt{-1})(\sqrt{-1})(\sqrt{-1}) = -i$ ($-1 \cdot i$)

$i^4 = (\sqrt{-1})(\sqrt{-1})(\sqrt{-1})(\sqrt{-1}) = 1$ ($-1 \cdot -1$)

Sep 5-10:03 AM

List 4 real numbers: $\frac{1}{3}$, $\sqrt{16}$, .25, $2\pi$

Which numbers on your list are rational? $\frac{1}{3}$, $\sqrt{16}$, .25

Which numbers on your list are irrational? $2\pi$

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List 4 imaginary numbers: $\sqrt{-1}$, $\sqrt{-2}$, $\sqrt{-3}$, $\sqrt{-4}$

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Writing assignment:
All writing assignments must be written clearly and in complete sentences.

1) What is the difference between a rational and an irrational number?

Sep 5-10:03 AM

**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, ¼, -5, .25, 0, .3333333...

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

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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, ¼, -1, 0, 1, 2, 0.3, √4, √12, -¾

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 ¾ 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.

Sep 5-2:30 PM

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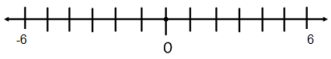
Examples. Given the following numbers, place them on their correct position on the number line with a dot and their corresponding letter.

| -1 | 2 ½ | .5 | -4.5 | 5.3 | $-\frac{7}{2}$ |
|---|---|---|---|---|---|
| A | B | C | D | E | F |

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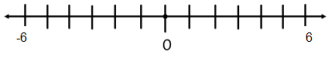
Now you try:

| $\frac{8}{2}$ | 1.25 | -3.8 | -5 | $3\frac{2}{3}$ | -2.5 |
|---|---|---|---|---|---|
| K | L | M | N | P | Q |

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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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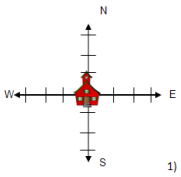
***Absolute Value –***




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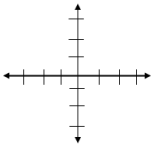
Let's look at the directional arrows like number lines. Mark each point again.



| 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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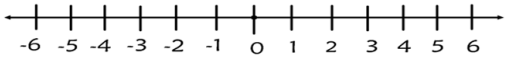
1-2 Homefun: Ordering Numbers, Absolute Value

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 ½ 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 ½

C) -28.30

D) 0

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