Algebra 1R – Mr. Bo
Unit 1 – Day 1 Notes

Name:______________________
Date: _______________

Numbers – Sets & Properties

Exploring Real Number Sets: Define each number set based on the number examples given.

Natural Numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12...

the counting numbers

Whole Numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12...

the Natural #'s and zero

Integers: ...-6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6...

the whole numbers and their opposites.

Rational Numbers: $\frac{1}{2}, \frac{3}{4}, \frac{-2}{5}, \frac{9}{3}, \frac{-7}{7}, \frac{0}{8} \ldots$

Fractions... numbers of the form $\frac{a}{b}$ where a and b are integers.

Irrational Numbers: π, $\sqrt{2}$, $-\sqrt{3}$, $\sqrt{7}$ ...

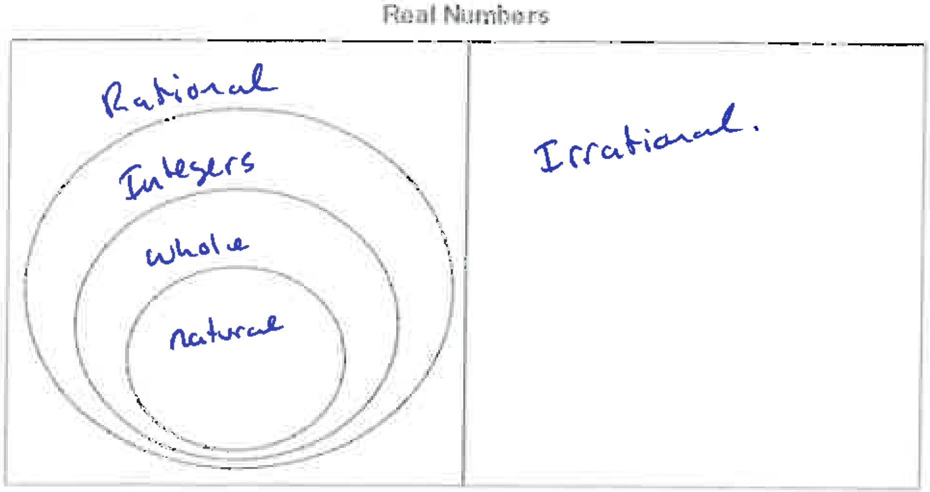
that can't be written as $\frac{a}{b}$, where a and b are integers.

Real Numbers: $0, \pm 1, \pm 2, \pm\sqrt{2}, \pm\frac{5}{7}, \pm\frac{9}{3} \ldots$

Rational and irrational # put together.

Write each number set in its appropriate place on the Venn diagram:

Real Numbers



Exploring Closure: What does it mean for a set of numbers to be "Closed"?

using an operation to combine 2 numbers from a set results in a number in the same set.

For each operation, if the number set is closed, explain why. If the set is not closed, give a **counterexample**.

Number Set	Addition	Subtraction	Multiplication	Division
Natural Numbers	Closed. adding 2 natural #'s makes a natural #.	closed	closed	not closed $\frac{1}{2}$ is not natural.
Whole Numbers	closed	closed	closed	$\frac{1}{2}$ is not whole not closed
Integers	closed	closed	closed	$\frac{1}{2}$ Is not integer not closed
Rational Numbers	Closed	closed	Closed	Closed $\frac{1}{2}$ is rational.
Irrational Numbers	closed	Closed	not ~~dd~~ closed: $\sqrt{2} \cdot \sqrt{2} = \sqrt{4}$ $= 2$ Is not irrational	not closed $\frac{\sqrt{2}}{\sqrt{2}} = 1$ not irrational.
Real Numbers	Closed	Closed	Closed	Closed.

Number Properties:

1. **Commutative Property:**

Addition: $a+b=$ b+a

Multiplication: $ab=$ ba

2. **Associative Property:**

Addition: $(a+b)+c=$ a+(b+c)

Multiplication: $(ab)c=$ a(bc)

3. **Identity Property:**

Addition: $a+0=$ a

Multiplication: $a \cdot 1=$ a

4. **Inverse Property:**

Addition: $a+-a=$ 0

Multiplication: $a * \frac{1}{a}=$ 1

5. **Distributive Property:**

Addition: $a(b+c)=$ ab+ac

Subtraction: $a(b-c)=$ ab-ac

Examples

1. Name the property that each illustrates.

a. $9+7=7+9$ commutative. (x)

b. $(8 \cdot 4) \cdot 3=8 \cdot (4 \cdot 3)$ Associative. (+)

c. $3+0=3$ Identity of addition.

d. $np=pn$ commutative. (x)

2. Next to each step, identify the property used in the step.

$8(x+4)+2x$

$8x+32+2x$ distributive property

$32+8x+2x$ commutative.

$32+10x$ combine like terms.