Day 2
HW/Notes

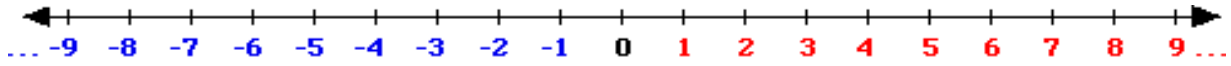
1.1 & 1.2 PROPERTIES OF REAL NUMBERS

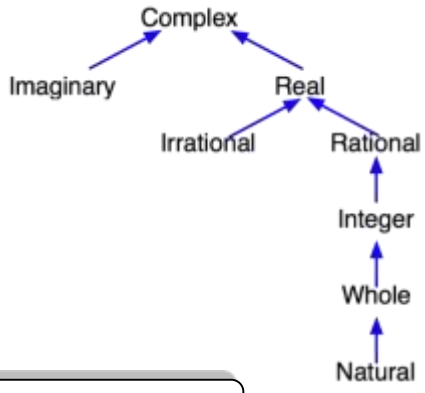
OBJECTIVES: 1) Classify real numbers and use properties of real numbers to evaluate expressions.

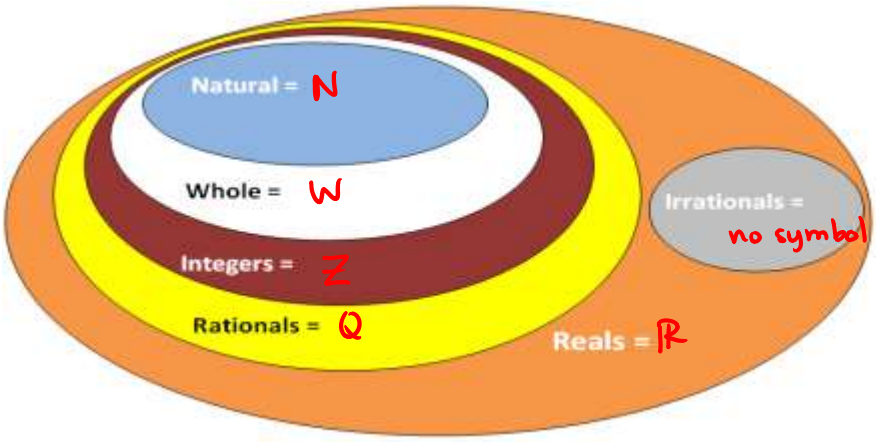
REAL NUMBERS:

Any number that can be expressed in decimal form; any number found on the number line.

Every number that can be plotted on a number line is a real number.







DEFINITIONS

Imaginary Numbers: A non-real number (we'll get to these during 2nd semester) $3i$

Counting/Natural Numbers: Counting numbers without 0 $\{1, 2, 3, 4, 5, \ldots\}$

Digits: Counting numbers 0-9 $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$

Wholes Numbers: Counting numbers with 0 $\{0, 1, 2, 3, \ldots\}$

Integers: Whole numbers AND negative numbers $\{\ldots -3, -2, -1, 0, 1, 2, 3, \ldots\}$

Rational Numbers: Any number that can be expressed as a ratio of two integers ex: $0, -2.75, \frac{3}{4}$

Irrational Numbers: Non-repeating and non-terminating decimals ex: $\sqrt{2}, \sqrt{3}, \sqrt{5}$

Transcendental Numbers: An irrational number represented with a symbol ex: π, e

Examples: Name the sets of numbers each number belongs to.

1) $-\frac{2}{3}$ $\mathbb{R}$, $\mathbb{Q}$

2) $\sqrt{121}$ $\mathbb{R}, \mathbb{Q}, \mathbb{Z}, \mathbb{N}, \mathbb{W}$

3) $9.\overline{9}$ $\mathbb{R}, \mathbb{Q}$

4) $\sqrt{6}$ $\mathbb{R}$, irrational

5) -22.79 $\mathbb{R}, \mathbb{Q}$

6) $1{,}525{,}700$ $\mathbb{R}, \mathbb{Q}, \mathbb{Z}, \mathbb{N}, \mathbb{W}$

NUMBER PROPERTIES

Property	Addition Properties	Multiplication Properties
Commutative	$a+b=b+a$	$ab=ba$
Associative	$(a+b)+c=a+(b+c)$	$a(bc)=(ab)c$
Identity	$a+0=a$ 0 is the identity element of addition	$a\cdot 1=a$ 1 is the identity element of multiplication
Inverse	$a+-a=0$ Adding opposites gives you the identity element of addition.	$a\cdot\frac{1}{a}=1$ Multiplying by the reciprocal gives you the identity element of multiplication.
Distributive (over addition)	$a(b+c)=ab+ac$	$a(bc)\neq ab\cdot ac$ $6\left(\frac{1}{2}\cdot 4\right)\neq 6\left(\frac{1}{2}\right)\cdot 6(4)$

Solve in the indicated domain:

1) $2x+3=x-1$

a) {reals}
b) {positive numbers}
c) {integers

$2x+3=x-1$

$x=-4$

a) $\{-4\}$

b) $\{\}$ or $\emptyset$

c) $\{-4\}$

2) $x^2=8$

a) {reals}
b) {rational}
c) {negative reals}

$x^2=8$

$x=\pm 2\sqrt{2}$

a) $\{\pm 2\sqrt{2}\}$

b) $\emptyset$

c) $\{-2\sqrt{2}\}$

3) $(x+5)(2x-3)=0$

a) {reals}
b) {rational}
c) {integers}

$x+5=0 \quad 2x-3=0$

$x=-5 \quad x=3/2$

a) $\{-5, 3/2\}$

b) $\{-5, 3/2\}$

c) $\{-5\}$