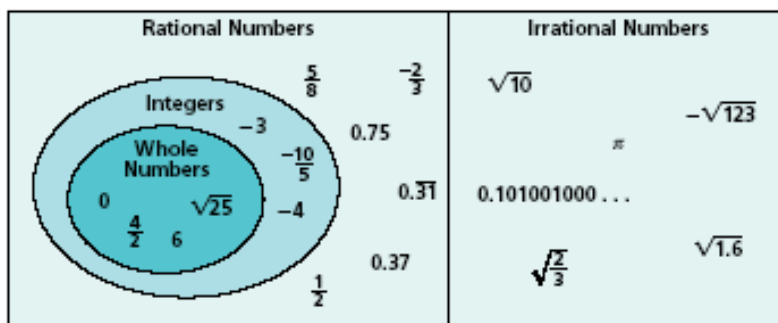


The Real Number System



<u>Type</u>	<u>Definition</u>	<u>Examples</u>
Natural	The set of numbers 1, 2, 3, 4, ... Also called the _____ numbers.	1, 2, 3, 4, ...
Whole	Natural numbers (counting numbers) and _____.	0, 1, 2, 3, 4, ...
Integers	Whole numbers and their _____.	..., -2, -1, 0, 1, 2, ...
Rational	Any number that can be written as a _____. When in decimal form the number pattern repeats or terminates.	$\frac{3}{4}$, $-4\frac{1}{2}$, 7.95, and 0.123123...
Irrational	Numbers that _____ be expressed as a ratio of two integers. Their decimal expansions are nonending and nonrepeating.	π , $\sqrt{2}$, $\sqrt[3]{19}$
Real	All _____ and _____ numbers.	
<i>A Quizlet link is available on Schoology to help you STUDY these definitions!</i>		

Example 1: Name all sets of numbers to which each real number belongs. Circle the smallest set.

a. $-\frac{17}{31}$

b. 23

c. 0

d. 4.581

e. -12

h. $\sqrt{3}$

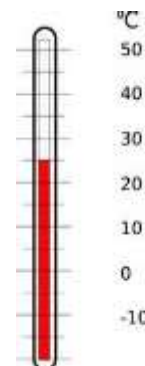
Example 2: Which set of number is most reasonable for the situation?

a. the number of M&M candies in a bag

b. outdoor temperatures

c. an ingredient list for baking cookies

d. the area of a circle



Properties of Real Numbers

Let a, b, and c represent real numbers.

Property	of Addition	of Multiplication
Closure	$a + b$ is a real number	ab is a real number
Commutative	$a + b = b + a$	$ab = ba$
Associative	$(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
Identity	$a + 0 = a, 0 + a = a$	$a \cdot 1 = a, 1 \cdot a = a$
Inverse	$a + (-a) = 0$	$a \cdot \frac{1}{a} = 1, a \neq 0$

Other Properties	
Distributive	$a(b + c) = ab + ac$
Multiplication Property of Zero	$a \cdot 0 = 0$
Multiplication Property of -1	$-1 \cdot a = -a$

Example 3: Name the property of real numbers illustrated by each equation.

a. $6 + -6 = 0$

b. $(-4 \cdot 1) - 2 = -4 - 2$

c. $t + 0 = t$

d. $(d \cdot 4) \cdot 3 = d \cdot (4 \cdot 3)$

e. $\frac{2}{3} \cdot \frac{3}{2} = 1$

f. $\sqrt{7} \cdot 2 = 2 \cdot \sqrt{7}$

g. $m \cdot 0 = 0$

h. $\sqrt{2}(\pi + 7) = \pi\sqrt{2} + 7\sqrt{2}$

i. $1m = m$

j. $(-3 + 4) + 5 = -3 + (4 + 5)$

k. $3(8 \cdot 0) = (3 \cdot 8)0$

l. $(3 + 0) - 5 = 3 - 5$

m. $9 + 7 = 7 + 9$

n. $-q = -1q$

Example 4: Use the distributive property to find each product.

a. $2(x + 4)$

b. $-3(4y - 7)$

c. $-(x + 4)$

d. $2x(3x - 1)$