

## Math 9: Unit 3: Rational Numbers

### Unit Outcomes:

- Demonstrate an understanding of rational numbers by:
  - × Comparing and ordering rational numbers
  - × Solving problems that involve arithmetic operations on rational numbers
- Explain and apply the order of operations, including exponents, with and without technology.

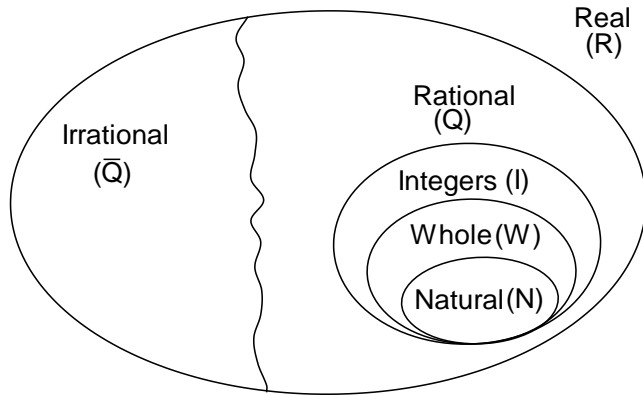
### REAL NUMBER SYSTEM

Number Set	Notation	Written as:
Natural	<b>N</b>	1, 2, 3, ...
Whole	<b>W</b>	0, 1, 2, 3, ...
Integer	<b>I</b>	...-3, -2, -1, 0, 1, 2, 3, ...
Rational	<b>Q</b>	Any number that can be written as a fraction $\frac{m}{n}$ where m and n are integers and $n \neq 0$ .
Irrational	$\bar{Q}$	Any number that cannot be written as a fraction
Real	<b>R</b>	All rational and irrational numbers

Deciding whether decimals are rational (**Q**) or irrational ( $\bar{Q}$ ) numbers is relatively simple:

**NOTES:** If the decimal repeats or terminates, it is a rational number. If the decimal does not repeat or terminate, it is an irrational number.

The **Real number system** can be shown using a Venn diagram. Basically the real number system is broken into two groups or sets: Rational (Q) and Irrational numbers ( $\bar{Q}$ ). Within the rational number set are the subsets of integers (I), Natural numbers (N), and Whole numbers (W).



Note:  
 Each smaller subset of numbers is a subset of a larger set of numbers.

Ex. **N** is a subset of **W**  
**W** is a subset of **Q**  
**I** is a subset of **Q**  
**Q** is a subset of **R**

### Section 3.1

**EXAMPLE 1:** Indicate with a check mark the set to which each number belongs.

	<b>N</b>	<b>W</b>	<b>I</b>	<b>Q</b>	$\bar{Q}$	<b>R</b>
6						
-3						
$\frac{2}{3}$						
-2.7						
$\sqrt{11}$						
0						
	<b>N</b>	<b>W</b>	<b>I</b>	<b>Q</b>	$\bar{Q}$	<b>R</b>
6	✓	✓	✓	✓		✓
-3			✓	✓		✓
$\frac{2}{3}$				✓		✓
-2.7				✓		✓
$\sqrt{11}$					✓	✓
0		✓	✓	✓		✓



**EXAMPLE 5:** Which number in each pair is greater?

(a)  $1\frac{732}{1000}$   $\left( < \right)$   $\sqrt{3}$

(c)  $-\sqrt{6}$   $\left( < \right)$   $-\sqrt{5}$

(b)  $\sqrt{8}$   $\left( > \right)$   $2.5$

(d)  $0.\bar{3}$   $\left( > \right)$   $\frac{3}{10}$

**EXAMPLE 6:** Name THREE rational numbers between 1.25 and 3.2.

You could use a numberline and arbitrarily choose numbers between the two benchmarks.

1.3

$2\frac{1}{2}$

3.1

