

# Algebra IIa

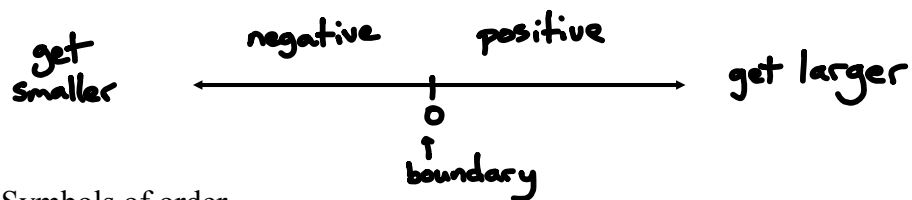
1-1 Day 2

## The Real Numbers and Set Notation

Number Systems- A trip through history.

Symbol	Name	Description
$\mathbb{N}$	Natural Numbers	$\{1, 2, 3, \dots\}$
	Whole Numbers	$\{0, 1, 2, 3, \dots\}$
$\mathbb{Z}$	Integers	$\{\dots -2, -1, 0, 1, 2, \dots\}$
$\mathbb{Q}$	<u>Rational Numbers</u>	Any number that can be written as a fraction
	Irrational Numbers	Can't be written as a fraction. $\pi, \sqrt{2}$ , all non-terminating, non-repeating decimals
$\mathbb{R}$	Real numbers	all the above.

Draw a pictorial representation of the Real Numbers -



Symbols of order -

$<$  less than       $\leq$  less than or equal to  
 $>$  greater than       $\geq$  greater than or equal to

### Definitions

Opposite - negative

Absolute Value -  $|-1| = 1$  makes its argument non-negative.

$$|0| = 0$$

Why do we need absolute value? distance

Set Notations:

1) Roster Method

*List all numbers*

Find the set of odd Natural Numbers less than 14.

$$\{1, 3, 5, 7, 9, 11, 13\}$$

Set Notations:

2) Set-builder Notation

*use with large sets.*

Find the set of Real numbers larger than 5 but less than or equal to 27.

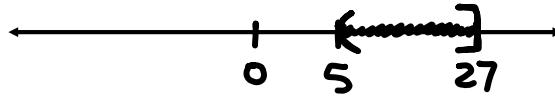
$$\{x : 5 < x \leq 27\}$$

Set Notations:

3) Interval Notation - number line:

$$\begin{array}{ll} < \rightarrow > & \leq \rightarrow ] \\ > \rightarrow < & \geq \rightarrow [ \end{array}$$

Find the set of Real numbers larger than 5 but less than or equal to 27.



3) Interval Notation - No number line.

Find the set of Real numbers larger than 5 but less than or equal to 27.

$$(5, 27]$$