More on Numbers: Absolute Value

- **Positive, negative**
- **Absolute value**

Graph of **R**, the real numbers:
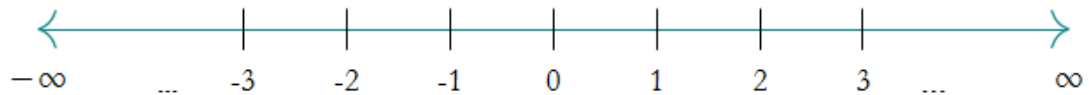
$$-\infty \qquad \ldots \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad \ldots \qquad \infty$$

Subset of real numbers, Naturals:

N = { 1, 2, 3, ...}

Subset of real numbers, Whole Numbers:

W = {0, 1, 2, 3, ...}

Subset of real numbers, integers:

Z = {..., −3, −2, −1, 0, 1, 2, 3, ...}

Segment between 11 and 12:

$$11 \quad 11.1 \qquad\qquad 11.4 \quad 11.581 \qquad\qquad 12$$
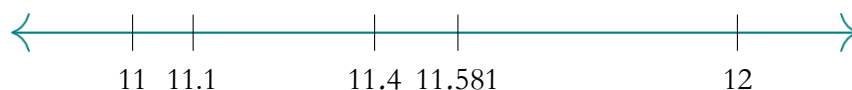
Segment between -13 and -12:

−13   −12.5   −12

Sets of Real Numbers

non-negative reals

negative reals   positive reals

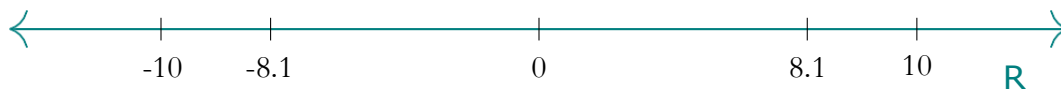-11.7   0   5.3   R
                    0.001

Absolute value

-10   -8.1   0   8.1   10   R
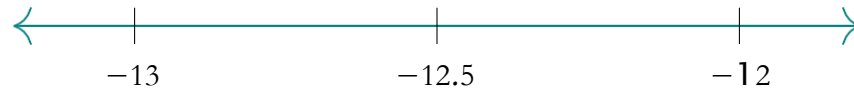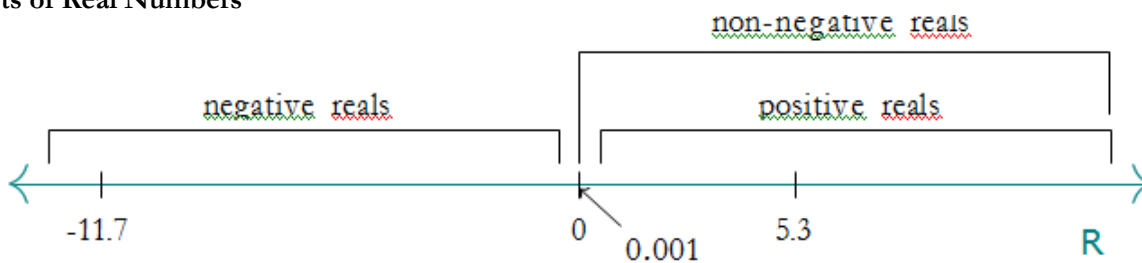
The absolute value of a number a, $|a|$, is the distance from a to 0. Example:

$$|8.1| = 8.1$$
$$|-8.1| = 8.1 = -(-8.1)$$

General rule:

For any $a \in \mathbf{R}$,

$$|a| = \begin{cases} a, & \text{if } a \text{ is non-negative} \\ -a, & \text{if } a \text{ is negative} \end{cases}$$

$$|10.7| = 10.7$$

$$|-20| = -(-20) = 20$$