Definition: Absolute Value

For any $x \in \mathbb{R}$

$$|x| \stackrel{D}{=} \begin{cases} x & , \text{ If } x \geq 0 \\ -x & , \text{ If } x < 0 \end{cases}$$

We also obtain an algebraic definition: $|x| \stackrel{D}{=} \sqrt{x^2}$, TODO: Proof of why