

Absolute values and inequalities

$$|x| > a$$

$$x - a > 0 \Rightarrow x > a$$

$$x - a < 0 \Rightarrow x < a$$

$$-a > x > a$$

or

x is less than $-a$ AND x is greater than a
BUT, this is impossible:



$$x < -a$$

OR

$$x > a$$

$$|x| < a$$

$$x - a < 0 \Rightarrow x < a$$

$$x - a > 0 \Rightarrow x > a$$

$$-a < x < a$$

or

x is greater than $-a$ AND x is less than a



$$x < a$$

AND

$$x > -a$$