

Math 121

Section 0.2

Absolute Values and Inequalities

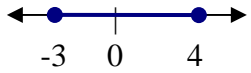
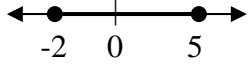

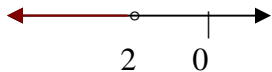
Introduction to Interval Notation

∞ - Positive Infinity

$-\infty$ - Negative Infinity

$()$ - open interval

$[\]$ - closed interval

Inequality	Graph	Interval
$-3 \leq x \leq 4$		$[-3,4]$
$-2 < x < 5$		$[-2,5]$
$x \geq 3$		$[3, \infty)$
$x < 2$		$(-\infty, 2)$

Rules for absolute value expressions with inequalities

Rule 1: $|x| < a \Leftrightarrow -a < x < a$

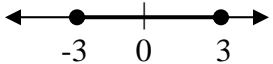
Rule 2: $|x| > a \Leftrightarrow x < -a \text{ or } x > a$

Example 1

Solve $|x| \leq 3$

$$|x| \leq 3$$

$-3 \leq x \leq 3$ by rule 1



A number line is shown with a vertical tick mark at 0. To the left of 0, there is a tick mark at -3. To the right of 0, there is a tick mark at 3. Solid black dots are placed at the -3 and 3 tick marks. A horizontal line segment with arrows at both ends passes through these two dots, representing the interval from -3 to 3.

Interval: $[-3, 3]$

Example 2

Solve $|x| \geq 2$

$$|x| \geq 2$$

$x \leq -2$ or $x \geq 2$ by Rule 2

Interval : $(-\infty, -2] \cup [2, \infty)$