Linear inequalities

Solving linear inequalities

Solving linear **inequalities** is similar to solving linear **equations** except we need to be careful with the direction of the inequality sign. Our solution will be a set of values of x.

Example: $1 - 2x \leq 7$

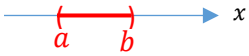
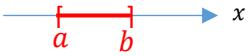
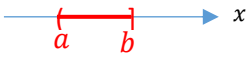
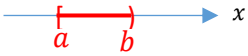
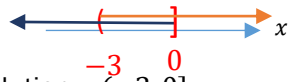
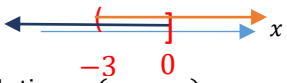
$-2x \leq 6$

$\frac{-2x}{-2} \geq \frac{6}{-2}$

$x \geq -3$

This can be written in interval notation as $[-3, \infty)$.

> Note: If there is division or multiplication by a negative number you must flip the inequality sign.

Inequality notation	In words	Interval notation	Line graph
$x < a$	x is less than a	$(-\infty, a)$	
$x \leq a$	x is less than or equal to a	$(-\infty, a]$	
$x > a$	x is greater than a	(a, ∞)	
$x \geq a$	x is greater than or equal to a	$[a, \infty)$	
$a < x < b$	x is between a and b (exclusive)	(a, b)	
$a \leq x \leq b$	x is between a and b (inclusive)	$[a, b]$	
$a < x \leq b$	x is greater than a and less than or equal to b	$(a, b]$	
$a \leq x < b$	x is greater than or equal to a and less than b	$[a, b)$	
Compound Inequalities	AND, the intersection of sets, i.e. contains only elements common to both sets, the overlap	$\cap$	$x > -3$ and $x \leq 0$  Solution: $(-3, 0]$
	OR, the union of sets i.e. contains all the elements from both sets	$\cup$	$x > -3$ or $x \leq 0$  Solution: $(-\infty, \infty)$

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