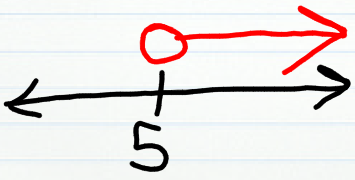
13

Linear Inequalities

Symbol	Meaning	Shading	Boundary Point
$>$	greater than	right	open
$\geq$	greater than or equal to	right	closed
$<$	less than	left	open
$\leq$	less than or equal to	left	closed

Examples: $x > 5$



$x \leq -2$

$3 \leq x$

Read backwards, this is $x \geq 3$.

$x \geq 3$

$-2 < x$

Read backwards, this is $x > -2$.

Solving: Just like solving an equation, except...
if you divide or multiply by a negative number, reverse the inequality symbol.

$11 + 8x \geq 7$

$-11 \quad -11$

$\frac{8x}{8} \geq \frac{-4}{8}$

$x \geq -\frac{1}{2}$

$15 - 3x < 3$

$-15 \quad -15$

$\frac{-3x}{-3} < \frac{-12}{-3}$

$x > 4$

12

Compound Inequalities

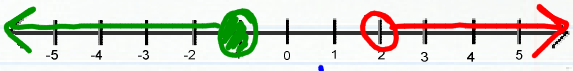
Compound Inequality - two simple inequalities joined by "and" or "or".

AND: the solutions are all real numbers that "work" in both inequalities.

Graph $x < 2$ and $x \geq -1$

$-1 \leq x < 2$

Graph $x > 2$ and $x \leq -1$

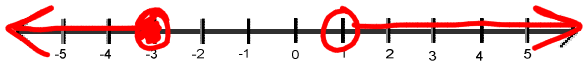


no solution

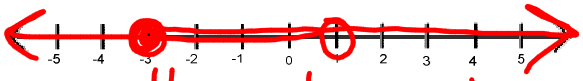
Compound Inequality - two simple inequalities joined by "and" or "or.

OR: the solutions are all real numbers that "work" in <u>either</u> inequality.

Graph $x > 1$ or $x \leq -3$



Graph $x < 1$ or $x \geq -3$



all real numbers

Solve: $-1 \leq x+3 < 10$

$-3 \quad -3 \quad -3$

$-4 \leq x < 7$

P.33
#7

$x + y = 3{,}577{,}600$
$-y \quad -y$

$10x + 20y = 66{,}368{,}000$

$x = 3{,}577{,}600 - y$

$10(3{,}577{,}600 - y) + 20y = 66{,}368{,}000$