

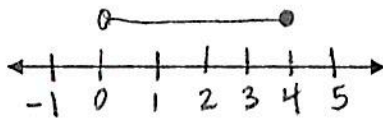
Algebra RH

Essential Question: How do we solve and graph compound inequalities?

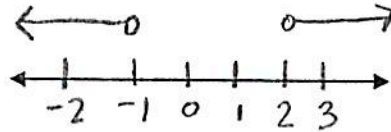
Do Now: Graph the following compound inequalities on a number line.

a. $0 < x \leq 4$

$x > 0$ and $x \leq 4$



b. $x < -1$ or $x > 2$



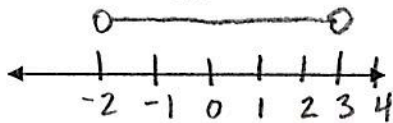
Solving a Compound Inequality with AND

A compound inequality containing the word **AND** is true only if both inequalities are true. This type of inequality is called a conjunction.

Examples of Conjunctions:

1. $x - 4 > -6$ and $x - 4 < -1$
 $+4 +4$ $+4 +4$

$x > -2$ and $x < 3$



Represent the solution set in interval notation.

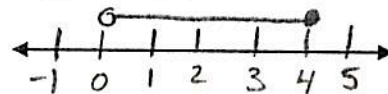
Interval: $(-2, 3)$

2. $2 < 3x + 2 \leq 14$

$3x + 2 > 2$ and $3x + 2 \leq 14$

$3x > 0$ $3x \leq 12$

$x > 0$ and $x \leq 4$



Interval: $(0, 4]$

Solving a Compound Inequality with OR

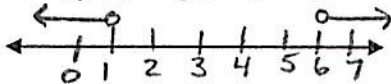
A compound inequality containing the word **OR** is true if either of the inequalities are true. This type of inequality is called a disjunction.

Examples of Disjunctions:

3. $3x + 1 < 4$ or $2x - 5 > 7$

$3x < 3$ $2x > 12$

$x < 1$ or $x > 6$

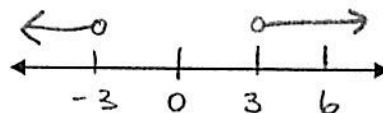


Represent the solution set in interval notation.

Interval: _____

4. $2y < y - 3$ or $3y > y + 6$

$y < -3$ or $2y > 6$
or $y > 3$

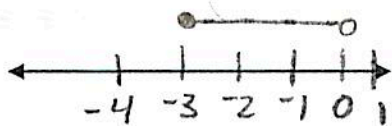


Interval: _____

Extra Examples: Solve the compound inequality and graph the solution.

5. $-2 < -2 - x \leq 1$

$-2 - x > -2$ and $-2 - x \leq 1$
 $-x > 0$ $-x \leq 3$
 $x < 0$ and $x \geq -3$

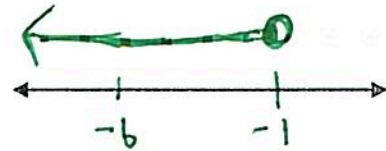


Represent the solution set in interval notation.

Interval: $[-3, 0)$

6. $3 - x > 4$ or $\frac{1}{2}x + 1 \leq -2$

$-x > 1$ $\frac{1}{2}x \leq -3$
 $x < -1$ or $x \leq -6$



Interval: $(-\infty, -1)$

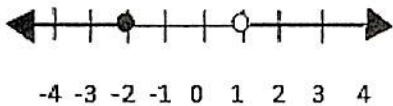
7. Describe the solution set shown below in two different ways.



Inequality Statement: $-4 \leq x \leq 5$

Interval Notation: $[-4, 5]$

8. Write a compound inequality for the solution set shown below. Describe the solution set using interval notation.



Inequality Statement: $x \leq -2$ or $x > 1$

Interval Notation: $(-\infty, -2] \cup (1, \infty)$

9. Describe the solution set of the following compound inequality: $-8 < x < -8$

there is no solution
 there is no # that is
 greater than -8 and at
 the same time less than -8

$\pm 3\%$

10. A poll shows that a candidate is projected to receive 57% of the votes. If the margin of error is plus or minus 3%, write a compound inequality for the percentage of votes the candidate can expect to get.

Let x = the percentage of votes

$$57\% - 3\% \leq x \leq 57\% + 3\%$$

$$54 \leq x \leq 60$$

11. Mercury is one of only two elements that is liquid at room temperature. Mercury is non-liquid for temperatures less than -38.0°F or greater than 673.8°F . Write a compound inequality for the temperatures at which mercury is non-liquid.

remember to define the variable that you chose $x < -38.0$ or $x > 673.8$
 $x = \text{Mercury's temperature}$

Algebra RH

HW #

Solve each inequality. Graph the solution set on a number line, if possible.

1) $4x < 12$

2) $-6 > \frac{x}{3}$

3) $2x + 1 > 7$

4) $7 \geq 2x - 7$

5) $-4 \geq 4 - \frac{x}{2}$

6) $3x - 4 < 2x + 5$

7) $7x < 3 + 7(x - 1)$

8) $4(2 - x) \geq -(x - 5)$

9) $\frac{3}{4} < 6 - \frac{1}{2}x$

10) $8 < 2(4 - x)$

11) $-2 < x - 2 \leq 1$

12) $-6 \leq 3 + x < 4$

13) $5(2x + 1) - 3(x + 1) < 7x + 5$

14) $1 + 2x < -9$ or $1 + 2x > 9$

15) $-6x > 18$ or $12 + 3x \geq 0$

16) $1 - 4x \leq 3 - 5x \leq x - 3$

17) $5 - x \leq 3 - 2x$ or $x + 2 > 3x - 2$

18) $-7 > -1 + 2x$ and $-1 + 3x \geq 8$