

Date:

Section 2.5
Intermediate Algebra
Digital Notes

Compound Inequalities

Definition - A **compound inequality** is

Connectives

AND -

OR -

Examples - True or False?

$$2 < 3 \quad \text{AND} \quad -6 > -7$$

$$5 > 0 \quad \text{AND} \quad 1 > 2$$

$$-1 > 1 \quad \text{OR} \quad 2 < 4$$

$$-2 < -3 \quad \text{OR} \quad -10 < -12$$

Now try 8, 10, 12. (More practice? 7, 9, 11)

Example - Consider $x > 2$ AND $x < 5$.

Solutions?

Example - Consider $x > 4$ OR $x < -1$.

Solutions?

Now try 14, 16, 20. (More practice? 13, 15, 19)

Process - Solving Compound Inequalities

1. Solve both simply inequalities for 'x'.
2. Graph the solution set to both inequalities on the same real number line.
3. Determine the solution set by the following rule:
 - **AND**: The solution set to the compound inequality is found where the shaded regions **overlap** one another.
 - **OR**: The solution set to the compound inequality is found by taking or accepting all shaded regions and **combine** them together.
4. Redraw your graph to reflect your final answer and write the answer using intervals.

Notation

Union - \cup

Intersection - \cap

Example - Solve: $x > 2$ *AND* $x < 5$

Example - Solve: $x > 4$ *OR* $x < -1$

Special Cases

Example - Solve: $x \leq 6$ *AND* $x > 9$

Example - Solve: $x \leq 6$ OR $x > -2$

Now try 22, 24, 26, 28, 30, 32, 34. (More practice? 21, 23, 25, 27, 29, 31, 33)

Typical Cases

Example - Solve: $x - 3 > 7$ OR $3 - x > 2$

Example - Solve: $2x - 3 \leq 5$ AND $x - 1 > 0$

Now try 36, 40, 42, 44. (More practice? 37, 39, 43)

Example - Solve: $-3 < x + 1 < 3$

Example - Solve: $-2 < \frac{1-3x}{-2} < 7$

Now try 48, 50, 54, 58. (More practice? 49, 51, 53, 57)

Simplifying Intervals

Example - Write as a single interval: $(-\infty, 5) \cap (-\infty, 9)$

Example - Write as a single interval: $[1, 4) \cup (2, 6]$

Now try 60, 62, 64, 68, 70, 72. (More practice? 59, 63, 65, 67, 69)

From Graph to Inequality

Example - 73 from book

Example - 77 from book

Now try 74, 76, 78, 84, 90. (More practice? 75, 79, 82, 83, 89)