

Compound inequality

[Science](#), [Mathematics](#)



Mathematics: compound inequalities al affiliations Compound inequalities

Compound inequalities must contain at least two inequalities. The two inequalities are separated by either ' and' or ' or'. The graph representing a compound inequality with and constitutes the intersection of the two inequalities. A number satisfying this inequality must satisfy both the inequalities.

The graph of the compound inequalities with or represents the union of the two inequalities. A number satisfying this inequality must satisfy at least one of the inequalities. The problem at hand involves two compound inequalities. One with and, the other with or.

In solving compound inequalities, we separate the compound inequality into two and then solve each inequality separately. We have to recall that when multiplying or dividing equalities by a negative number reverses the sign of the inequality.

The first compound inequality is

$$-17 < 3 + 10x \leq 33$$

Separating the inequality in to two gives

$$-17 < 3 + 10x \text{ and } 3 + 10x \leq 33$$

We then solve each inequality separately. For the first one, subtract 3 from both sides of the inequality

$$-17 < 3 + 10x$$

$$-20 < 10x$$

Then divide both sides of the inequality by 10

$$-2 < x$$

For the second one,

$$3 + 10x \leq 33$$

Subtract 3 again from both sides of the inequality,

$$10x \leq 30$$

Divide both sides by 10

$$x \leq 3$$

The solution implies that x must be greater than -2 and less than or equal to

3

$$-2 < x \leq 3$$

This solution when represented on a simple line graph displays intersection of the graph of the inequalities.

The second compound inequality is

$$5x + 3 \leq -2 \text{ or } 13 - x \leq 6$$

Solve the two inequalities independently. For the first part,

$$5x + 3 \leq -2$$

Subtract 3 from both sides of the inequality

$$5x \leq -5$$

Divide both sides of the inequality by 5

$$x \leq -1$$

For the second part,

$$13 - x \leq 6$$

Subtract 13 from both sides of the inequality

$$-x \leq -7$$

Divide by -1 on both sides and reverse the inequality symbol

$$x \geq 7$$

The solution implies that x is less than or equal to -1 or x is greater than or

equal to 7.

$$x \leq -1 \text{ or } x \geq 7$$

The graph of the solution of the inequalities represents a union of the two inequalities.

Reference

Robillard, K., & Robillard, S. (2005). Top shelf. Advanced algebra. Portland, Me.: J. Weston Walch.