Solving Linear Inequalities in One Variable

A linear inequality looks like a linear equation, but instead of an equals sign it has a symbol of inequality: greater than or equal ($\geq$), greater than ($>$), less than or equal ($\leq$), or less than ($<$).

Solving an inequality is similar to solving an equation. You can:

- add the same quantity from each side of the inequality
- subtract the same quantity from each side of the inequality
- multiply both sides of an inequality by the same positive number
- divide both sides of an inequality by the same positive number

If you multiply or divide an inequality by a negative number the inequality symbol reverses: greater than becomes less than and vice-versa.

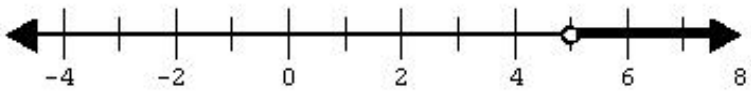
Example: Solve $2x - 5 > 13$

Solution: Add 5 to each side to get $2x > 18$
Divide both sides by 2 to get $x > 9$,

You can **graph** the an inequality on a number line by shading in all values of x that make the inequality true.

Example: Graph the inequality $x > 5$

Solution: The solution appears below. Notice that we place an open circle at $x = 5$ to show that this value is not part of the solution.



Problems

1. Solve each of the following inequalities.

a. $3x - 5 > 15 - 2x$ **b.** $2x - 3(1 - 2x) \le 31$ **c.** $x \ge 1 - x$

d. $2x < 3 - 4x$ **e.** $1.5 - 0.25x \ge 0.5x + 3.5$ **f.** $x \ge 2 + 3x$

g. $-3x < 2$ **h.** $2.3 \ge -0.2x$ **i.** $-2x < 1 - x$

2. Graph the solution set to each inequality.

a. $x \ge 2$ **b.** $2x \le x - 3$

c. $3x - 5 > -2$ **d.** $x(x - 5) < x(x - 4) + 2$