Solving Inequalities by Addition and Subtraction

An open sentence that contains an inequality is an inequality equation.
The solution to an inequality is an interval instead of just one solution.

To solve an inequality with adding or subtracting

1. Solve like you would a normal equation.
2. Check your answer.
3. Graph the inequality on a number line.

EXAMPLE 1: Solve $x - 12 \geq 8$

Step 1:

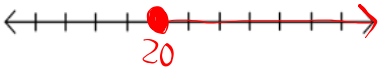
$+12 \quad +12$

$x \geq 20$

The solution is the set {all numbers greater than or equal to 20}

Step 2: To check, plug three different values into the original inequality; 20, a number less than 20, and a number greater than 20.

Step 3:



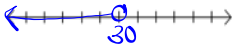
Example 2: Solve the inequalities

a) $22 > m - 8$

$+8 \quad +8$

$30 > m$

$m < 30$



b) $a + 6 \leq 4$

$-6 \quad -6$

$a \leq -2$

Application: A basketball player's goal was to score at least 150 points this season. So far, she has scored 123 points. If there is one game left, how many points must she score to reach her goal?

Define the variable:

Set up an Inequality: $p + 123 \geq 150$

$-123 \quad -123$

Solve the Inequality: $p \geq 27$

Solving Inequalities with Multiplication and Division

If you multiply/divide each side of an inequality by a positive, *then the inequality remains* same

Example: $4 > 2$

$4(3) \_?\_ 2(3)$ Multiply both sides by 3.

$12 > 6$ Simplify

*** Notice that the direction of the inequality remains the same. The statement is still true.**

If you multiply/divide each side of an inequality by a negative, *the inequality symbol* switches *direction.*

Example: $7 < 9$

$7(-2) \_?\_ 9(-2)$ Multiply both sides by -2.

$-14 > -18$ Simplify.

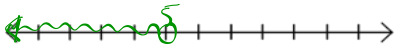
*** Notice that in order to keep the statement true, we needed to** Flip **the inequality symbol.**

To solve an inequality with multiplication and division.

1. Solve like you would a normal equation.
2. Remember to switch the inequality if needed. * or ÷ by a (-)
3. Graph the inequality on a number line.

EXAMPLE 1: Solve and graph the solution $\frac{8n}{8} < \frac{40}{8}$

$n < 5$

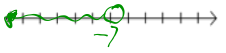


Example 2: Solve the inequalities

a) $\frac{-42}{6} > \frac{6p}{6}$

$-7 > p$

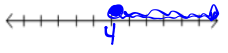
$p < -7$



b) $\frac{-28}{-7} \geq \frac{-7x}{-7}$

$4 \leq x$

$x \geq 4$



Solve the inequalities

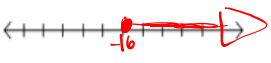
a) $-\frac{3}{4}p > -8$ · $-\frac{3}{4}$

$p < \frac{24}{4}$

$p < 6$

b) $-2 \cdot \frac{n}{2} \leq 8 \cdot -2$

$n \geq -16$



Application: Mario purchases a prepaid phone plan for $50 at $0.13 per minute. How many minutes can Mario talk on this plan?

Define the variable:

Set up an Inequality:

$\frac{0.13m}{0.13} \leq \frac{50}{0.13}$

$m \leq 384.61$

Solve the Inequality: