

Accuplacer Study Modules

TOPIC: Solving Linear Inequalities

Khan Academy Link: <https://www.khanacademy.org/math/algebra-basics/core-algebra-linear-equations-inequalities/core-algebra-linear-inequalities/v/inequalities-using-multiplication-and-division>

Sample Problem:

Solve the equation for x: $3 - 4(x + 5) \leq 2x - 7$

Follow the basic steps given below to solve most linear inequalities. You may not need every step, but you should consider each step in this order when solving your linear inequality. Your goal is to get the variable isolated or by itself.

- **Distribute**
- **Combine like terms** (like terms are ALREADY ON THE SAME SIDE OF THE INEQUALITY SIGN)
- **Get all variables to one side of the equation** (think “letters left”)
- **Get rid of addition or subtraction that is on the SAME SIDE as the variable**
- **Get rid of multiplication or division*** - THIS WILL ALWAYS BE YOUR LAST STEP. IF YOU MULTIPLY OR DIVIDE BOTH SIDES BY A NEGATIVE NUMBER IN THIS STEP, YOU MUST REVERSE THE INEQUALITY SYMBOL**

Solution

$$3 - 4(x + 5) \leq 2x - 7$$

Note: **Distribute -4.** Notice the sign of each term in parentheses changes

$$3 - 4x - 20 \leq 2x - 7$$

Note: **Combine like terms** (REMEMBER THEY MUST BE ON THE SAME SIDE OF THE EQUAL SIGN TO BE COMBINED IN THIS STEP)

$$\begin{array}{l} -4x - 17 \leq 2x - 7 \\ -2x \quad -2x \end{array}$$

Note: **Get all variables to one side.** For inequalities it is easiest to think of getting the “letters on the left” side of the inequality. To remove a term from one side of an inequality you must add the opposite to both sides.

$$-6x - 17 \leq -7$$

Note: **Get rid of addition or subtraction.** In this case, we get rid of the 17 since it is on the side that the “x” is on.

$$+17 \quad +17$$

$$-6x \leq 0$$

Note: get rid of multiplication – divide both sides by -6. **Because you are dividing through by a negative you reverse the inequality sign.**

$$\begin{array}{l} \frac{-6x}{-6} \leq \frac{0}{-6} \\ x \geq 0 \end{array}$$



Graph your solution if required. Use the below table to help you remember how to graph an inequality:

	SHADE TO THE LEFT	SHADE TO THE RIGHT
CLOSED CIRCLE	\leq	\geq
OPEN CIRCLE	$<$	$>$

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TOPIC: **Solving Linear Inequalities**

Instructions: Solve each inequality.

1. $5(x + 3) - 7x \geq -3$

2. $4x + 7 - 10x < -8x + 15$

3. $2(x - 6) > 5(2x + 4)$

4. $5 - 2(x + 3) \leq 4x + 2(x - 7)$