

## Solving and Graphing One Variable Inequalities

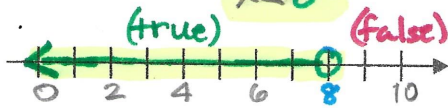
\* Inequalities have an **INFINITE** # of solutions (values that make it true.)

The solution to an inequality is the set of values that make the inequality true.

You solve an inequality very much like you would solve an equation, except you have to keep in mind that some operations will switch the inequality symbol. Anytime you multiply/divide by a NEGATIVE, you must remember that it flips the relationship and you must REVERSE the inequality symbol.

Solve:  $3(x - 4) + 2 < 14$

$$\begin{array}{r} 3(x-4) + 2 < 14 \\ -2 \quad -2 \\ \hline 3(x-4) < 12 \\ \hline x-4 < 4 \\ +4 \quad +4 \\ \hline x < 8 \end{array}$$



The value that you end up with when  $x$  is by itself is called the

dividing point.

For  $<$  or  $>$ , you use a open dot.

(The value is NOT included in the solution.)

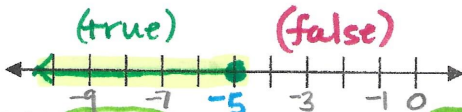
For  $\leq$  or  $\geq$ , you use a closed dot.

(The value IS included in the solution.)

Solve the following inequalities and graph the solutions.

1.  $5 - 4x \geq 25$

$$\begin{array}{r} 5 - 4x \geq 25 \\ -5 \quad -5 \\ \hline -4x \geq 20 \\ \hline \frac{-4}{-4} \quad \frac{20}{-4} \\ \hline x \leq -5 \end{array}$$



2.  $-2(4x - 5) < 4 - 2(x + 3)$

$$\begin{array}{r} -2(4x-5) < 4-2(x+3) \\ -8x+10 < 4-2x-6 \\ -8x+10 < -2x-2 \\ +2x \quad +2x \\ \hline -6x+10 < -2 \\ +10 \quad +10 \\ \hline -6x < -12 \\ \hline \frac{-6}{-6} \quad \frac{-12}{-6} \\ \hline x > 2 \end{array}$$



3. Keith has \$500 in a savings account at the beginning of the summer. He wants to have at least \$200 in the account by the end of the summer. He withdraws \$25 a week for food, clothes, and movie tickets. Write an inequality that represents Keith's situation. How many weeks can Keith withdraw money from his account? Justify your answer.

$w = \# \text{ weeks}$       $a = \$ \text{ in account}$

$$a = 500 - 25w$$

$$\text{\$ Amount in account} \geq 200$$

$$\begin{array}{r} 500 - 25w \geq 200 \\ -500 \quad -500 \\ \hline -25w \geq -300 \\ \hline \frac{-25}{-25} \quad \frac{-300}{-25} \\ \hline w \leq 12 \end{array}$$

Keith can withdraw money at this rate for up to 12 weeks and still have at least \$200 left in his account at the end of the summer.