

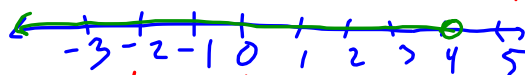
Minds on

Basic Inequalities

Inequalities are statements like:

$$x < 4$$

x is less than 4



$$x \leq -3$$

x is less than or equal to -3



$$x > 9$$

x is greater than 9

$$x \geq -5$$

x is greater than or equal to -5

lower bound

$$-10 \leq x \leq 4$$

double inequality

upper bound

x is greater than or equal to -10 and less than or equal to 4.

Minds on

Legal or Illegal?

We can all agree that $4 < 8$.

Perform the following operations to each side to see if the inequality holds up.

- $4 < 8$
- A. add 3 to both sides $7 < 11$ ✓
- B. subtract 3 from both sides $1 < 5$ ✓
- C. multiply both sides by 3 $12 < 24$ ✓
- D. multiply both sides by -3 $-12 < -24$ ✗
- E. divide both sides by 2 $2 < 4$ ✓
- F. divide both sides by -2 $-2 < -4$ ✗

Minds on

Legal or Illegal?

We can add, subtract, multiply and divide an inequality without worrying about the inequality sign.

However, if we multiply or divide by a **negative number**, we must reverse the inequality sign!

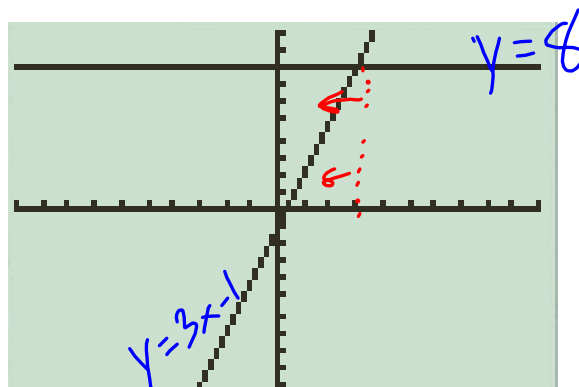
Action!

Solving Linear Inequalities

Solve the linear inequality below and check on a graphing calculator.

$$3x - 1 < 8$$

$$\begin{array}{r} +1 \quad +1 \\ 3x < 9 \\ \hline x < 3 \end{array}$$



Action!

Solving Linear Inequalities

Solve the linear inequality below and test your solution using LS RS checks.

$$\begin{array}{r}
 35 - 2x \geq 20 \\
 \underline{-35} \quad \quad \quad \underline{-35} \\
 -2x \geq -15 \\
 \underline{-2} \quad \quad \quad \underline{-2} \\
 x \leq \frac{15}{2} \\
 \underline{x \leq 7.5}
 \end{array}$$

Test $x = 7$	
L.S.	R.S.
$35 - 2x$ $= 35 - 2(7)$ $= 35 - 14$ $= 21$	20 ✓
$21 \geq 20$	
Test $x = 8$	
L.S.	R.S.
$35 - 2x$ $= 35 - 2(8)$ $= 35 - 16$ $= 19$	20 ✗

Action!

Solving Linear Inequalities

Solve the linear inequality below.

$$30 \leq 3(2x + 4) - 2(x + 1) \leq 46$$

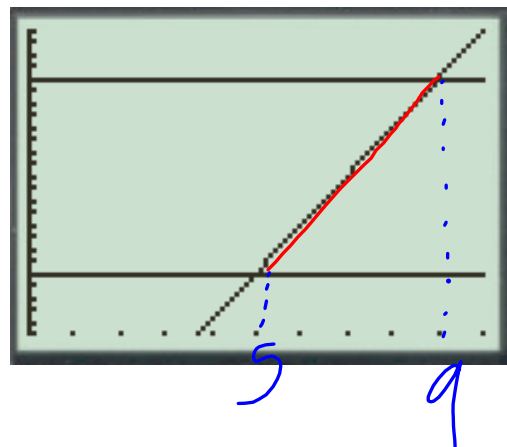
$$30 \leq 6x + 12 - 2x - 2 \leq 46$$

$$30 \leq 4x + 10 \leq 46$$

-10 -10 -10

$$\frac{20}{4} \leq \frac{4x}{4} \leq \frac{36}{4}$$

$$5 \leq x \leq 9$$



Consolidation

Secret Message

John has passed the note below to Sarah.
Rearrange the inequality to read the message.

Rearrange the inequality below for i .

$$9 - 7i > -3(7u - 3)$$

$$\cancel{9} - 7i > -21u + \cancel{9}$$

$$\frac{-7i}{-7} > \frac{-21u}{-7}$$

$$i < 3u$$

Pg. 213

2, 7, 8, 11

$$x \in [5, 9]$$

lower bound

upper bound

$$x \in (3, 5]$$

round bracket
does not include
value

square brackets
include value