Warm-up 10-2

Solve each equation for x.

1. $x - 5 = 3$

2. $x = 8 - 3$

3. $2x - 3 = 3$

4. $3x = 2x - 13$

Warm-up 10-2

Solve each equation for x.

1. $x - 5 = 3$

$+5 \quad +5$

$x = 8$

2. $x = 8 - 3$

$x = 5$

3. $2x - 3 = 3$

$+3 \quad +3$

$\frac{2x}{2} = \frac{6}{2}$

$x = 3$

4. $3x = 2x - 13$

$-2x \quad -2x$

$x = -13$

1. $10 set up $2 per cupcake

2. $30 set up 50¢ per cupcake

$10 + 2c = 30 + .5c

-0.5c -0.5c

1.5c + 10 = 30

-10 -10

1.5c = 20

1.5 1.5

c = 13.3

I want you each to think of a time that you had to wait to do something because of your age, size, money...

Once you have one, write that down in your notes.

Today's Goals

I can...

- write and graph inequalities with one variable.
- identify solutions of inequalities with one variable.
- solve one-step inequalities by using addition and subtraction.
- solve one-step inequalities by using multiplication and division.

Section 6.1 - Solving Inequalities

An **inequality** is a statement that two quantities are not equal. The quantities are compared by using the following signs:

Inequality Signs

$<$	$>$	$\leq$	$\geq$
- is less than - is fewer than	- is greater than - is more than - exceeds	- is less than or equal to - is no more than - is at most	- is greater than or equal to - is not less than - is at least

A **solution of an inequality** is any value of the variable that makes the inequality true.

Graphing Inequalities

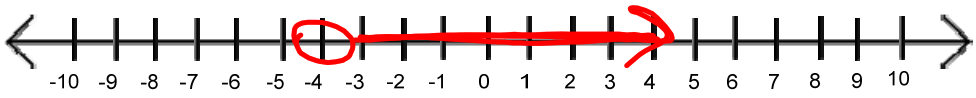
One variable inequalities must be graphed on a number line.

If the inequality sign used is >, <, ≠ then use an open circle to graph.

If the inequality sign used is a ≥, ≤, = then use a closed circle to graph.

Then draw an arrow to include the numbers that would make the statement true

$x > -4$

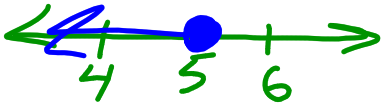


$x > 5.5$

$y < 35$

$5 \geq z$

$z \leq 5$



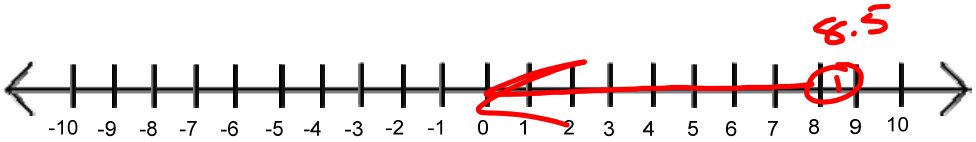
Try This!

Graph each inequality

1. $c > 2$

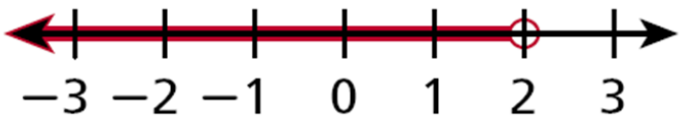
2. $x \leq -3$

3. $m < 8.5$

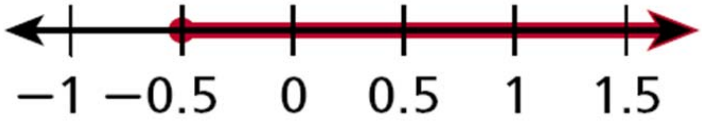


Writing an Inequality from a Graph

Write the inequality shown by each graph.



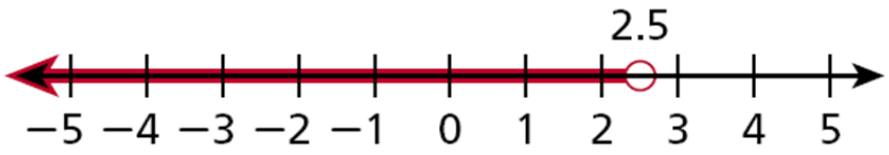
$y < 2$



$p \geq -0.5$

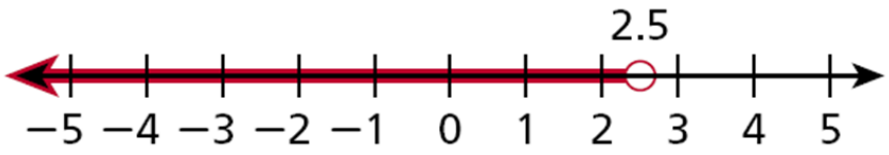
Try This!

Write the inequality shown by the graph.



Try This!

Write the inequality shown by the graph.



$h < 2.5$

Reading Math

<	>	≤	≥
- is less than - is fewer than	- is greater than - is more than - exceeds	- is less than or equal to - is no more than - is at most	- is greater than or equal to - is not less than - is at least

Statements of Inequalities

1. a is less than b $a < b$

2. a is greater than b $a > b$

3. a is greater than OR equal to b $a \geq b$

4. a is less than OR equal to b $a \leq b$

5. a is not equal to b $a \neq b$

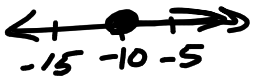
6. a is a negative number $a < 0$

7. b is a nonnegative number $b > 0$

Graph each inequality. Write an inequality for each situation.

1. The temperature must be at least –10°F.

t - tempeature $t \geq -10°F$



2. The temperature must be no more than 90°F.

x - temperature $x \leq 90°F$

Application Problems

Ray's dad told him not to turn on the air conditioner unless the temperature is at least 85°F. Define a variable and write an inequality for the temperatures at which Ray can turn on the air conditioner. Graph the solutions.

Let *t* represent the temperatures at which Ray can turn on the air conditioner.

$x \geq 85^{\circ}F$

Try This!

A store's employees earn no more than $10 per hour. Define a variable and write an inequality for the amount the employees may earn per hour. Graph the solutions.

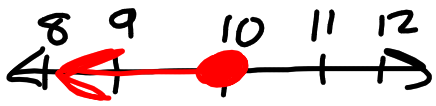
Let *w* represent an employee's wages.

Try This!

A store's employees earn no more than $10 per hour. Define a variable and write an inequality for the amount the employees may earn per hour. Graph the solutions.

Let *w* represent an employee's wages.

$w \leq \$10$



SECTION 6.2: SOLVING INEQUALITIES

Solving inequalities is much like solving equations. To solve an inequality, you need to isolate the variable using the properties of inequality and inverse operations.

Properties of inequality

1. **Addition Property** $a + c < b + c$; $a + c > b + c$

2. **Subtraction Property** $a - c < b - c$; $a - c > b - c$

SOLVING INEQUALITIES USING ADDITION AND SUBTRACTION

Solve the inequality and graph the solutions.

1. $m + 7 > 11$

$-7 \quad -7$

$m > 4$

2. $x - 11 < 15$

3. $34 < 16 + x$

$-16 \quad -16$

$18 < x$

$x > 18$

4. $18 \geq v - 2$

SOLVING INEQUALITIES USING ADDITION AND SUBTRACTION

Solve the inequality and graph the solutions.

1. $m + 7 > 11$

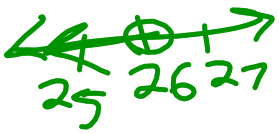
$-7 \quad -7$

$m > 4$

2. $x - 11 < 15$

$+11 \quad +11$

$x < 26$



3. $34 < 16 + x$

$-16 \quad -16$

$18 < x$

$x > 18$

4. $18 \geq v - 2$

$+2 \quad +2$

$20 \geq v$

$v \leq 20$

TRY THESE!!!

1. $d - 5 > -7$

2. $0.9 \geq n - 0.3$

3. $s + 1 \leq 10$

TRY THESE!!!

1. $d - 5 > -7$

+5 +5

$d > -2$

2. $0.9 \geq n - 0.3$

0.3 +0.3

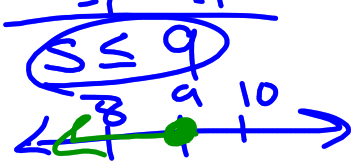
$1.2 \geq n$

$n \leq 1.2$

3. $s + 1 \leq 10$

-1 -1

$s \leq 9$



SECTION 6.2: SOLVING INEQUALITIES

Solving inequalities is much like solving equations. To solve an inequality, you need to isolate the variable using the properties of inequality and inverse operations.

Properties of inequality

1. **Addition Property** $a + c < b + c$; $a + c > b + c$

2. **Subtraction Property** $a - c < b - c$; $a - c > b - c$

3. **Multiplication Property** $a*c < b*c$; $a*c > b*c$
    1. If c = positive
4. **Division Property** $a/c < b/c$; $a/c > b/c$
    1. If c = positive

SOLVING INEQUALITIES USING DIVISION AND MULTIPLICATION

Important: *If you multiply or divide both sides of an inequality by a negative value, you MUST flip the sign in order to keep the inequality balanced.*

Example: $-4x > 36$

$\frac{-4x}{-4} < \frac{36}{-4}$

$x < -9$

Solve the inequality and graph the solutions.

1. $-12x > 84$

$\frac{-12x}{-12} < \frac{84}{-12}$

$x < -7$

2. $\frac{4}{5}k > 24$ (5)

$4k > 120$

$\frac{4k}{4} > \frac{120}{4}$

$k > 30$

3. $2(-3) - 8 \leq \frac{x}{-3}(-3)$

$24 \geq x$

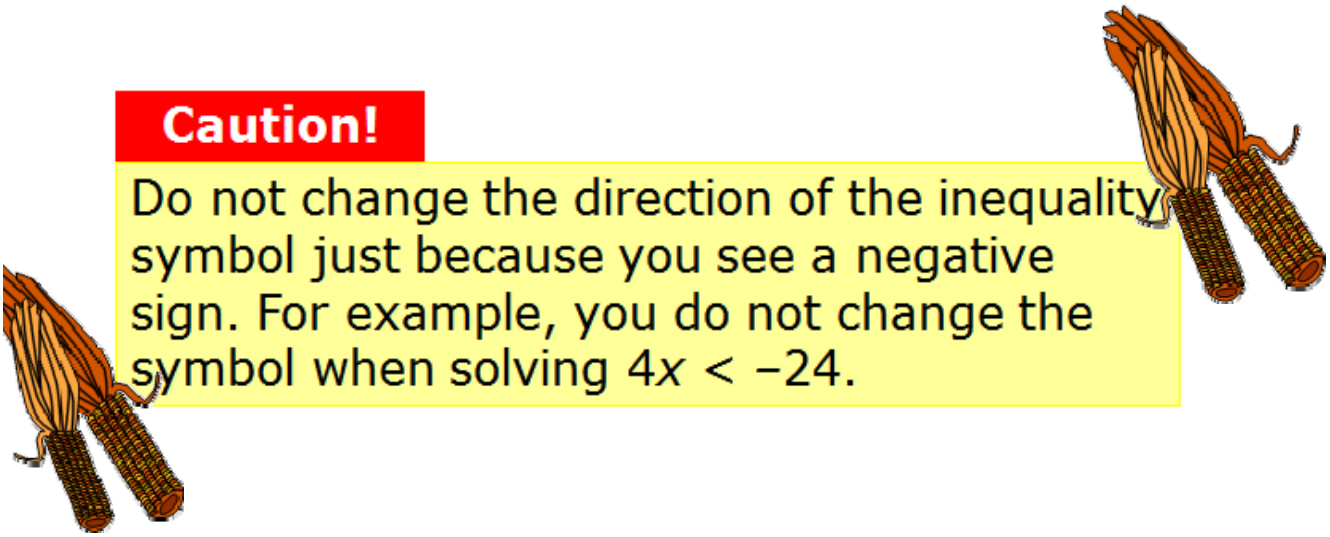
$x \leq 24$

4. $-50 \geq 5q$

$\frac{-50}{5} \geq \frac{5q}{5}$

$-10 \geq q$

$q \leq -10$



Caution!

Do not change the direction of the inequality symbol just because you see a negative sign. For example, you do not change the symbol when solving $4x < -24$.

SOLVING INEQUALITIES USING MULTIPLICATION AND DIVISION

Solve the inequality and graph the solutions.

1. $7m > 77$

2. $-x/3 < 5$

3. $34 < (1/2)x$

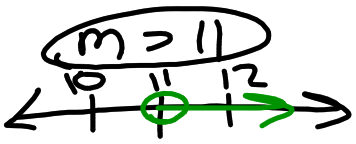
4. $18 \geq -2v$

SOLVING INEQUALITIES USING MULTIPLICATION AND DIVISION

Solve the inequality and graph the solutions.

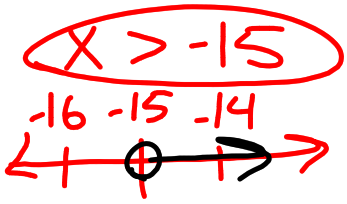
1. $\frac{7m}{7} > \frac{77}{7}$

$m > 11$



2. $\frac{-x}{-3} < \frac{5}{-3}$

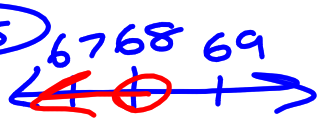
$x > -15$



3. $34 < (\frac{1}{2})x$ (2)

$68 < x$

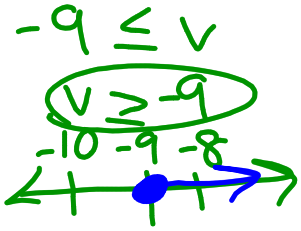
$x < 68$



4. $\frac{18}{-2} \geq \frac{-2v}{-2}$

$-9 \leq v$

$v \geq -9$



Today's Goals

I can...

- write and graph inequalities with one variable.
- identify solutions of inequalities with one variable.
- solve one-step inequalities by using addition and subtraction.
- solve one-step inequalities by using multiplication and division.

Homework

pg. 109 #1-15 (odd)

pg. 115 #1-17 (odd)