

6.4 Solving Linear Equations by Using Addition and Subtraction

- To solve an inequality, we use the same strategy as for solving an equation.

Equation:

$$x + 7 = 15$$

$$x + 7 - 7 = 15 - 7$$

$$x = 8$$

One solution: $x = 8$

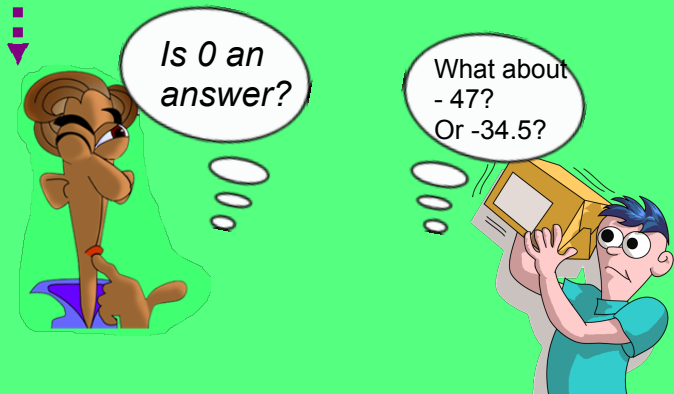
Inequality:

$$x + 7 < 15$$

$$x + 7 - 7 < 15 - 7$$

$$x < 8$$

MANY solutions; any number less than 8 is a solution.



Solving an Inequality

- a) Solve the inequality.
- b) Verify the solution.
- c) Graph the solution.

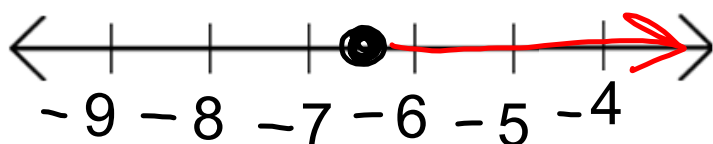
$$1. \ a) \quad x - 3.5 \geq -10$$

$$x \geq -6.5$$

The solution is all numbers greater than or equal to -6.5

c) Graph:

$$x \geq -6.5$$



b) Verify:

Choose numbers greater than -6.5, such as 8 or 20.

Substitute 8 into the original inequality:

$$x - 3.5 \geq -10$$

$$8 - 3.5 \geq -10$$

$$4.5 \geq -10$$

The statement is true so our solution satisfies the inequality.

What if we try 20?

$$x - 3.5 \geq -10$$

$$20 - 3.5 \geq -10$$

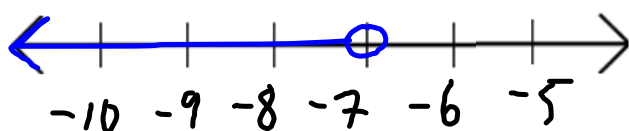
$$16.5 \geq -10$$

Try These!

$$2. \quad 5 > m + 12$$

$$5 - 12 > m + 12 - 12$$

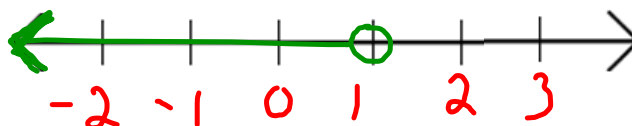
$$-7 > m$$



$$3. \quad -2y < -3y + 1$$

$$-2y + \underline{3y} < -3y + 1 + \underline{3y}$$

$$y < 1$$



Solving Problems Using Inequalities:

Alison plans to rent a hall for her grad party.

- The Douglastown Rec Centre charges \$90 plus \$20 an hour.
- The Chatham Head Rec Centre charges \$100 plus \$19 an hour.

For how many hours must she rent the hall in Douglastown in order for it to be less expensive than the hall in Chatham Head?

Solution:

Let h = number of hours

Douglastown: $90 + 20h$ Chatham Head: $100 + 19h$

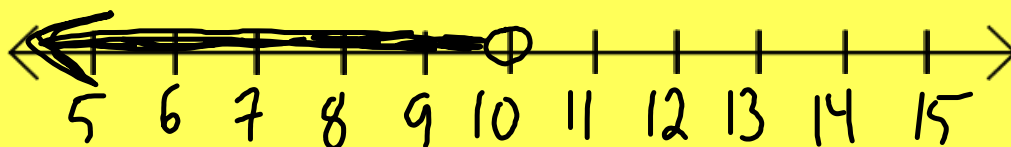
$$90 + 20h < 100 + 19h$$

$$90 + 20h - 19h < 100 + 19h - 19h$$

$$90 + h < 100$$

$$90 - 90 + h < 100 - 90$$

$$h < 10$$



Match each inequality with the graph of its solution:

a) $x - 3 > 5$
 $x - 3 + 3 > 5 + 3$
 $x > 8$

b) $-10 \geq -4 + p$
 $-6 \geq p$
 $p \leq -6$

c) $7 < r + 8$
 $-1 < r$

d) $-5 + w \leq -2$
 $w \leq 3$

