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:

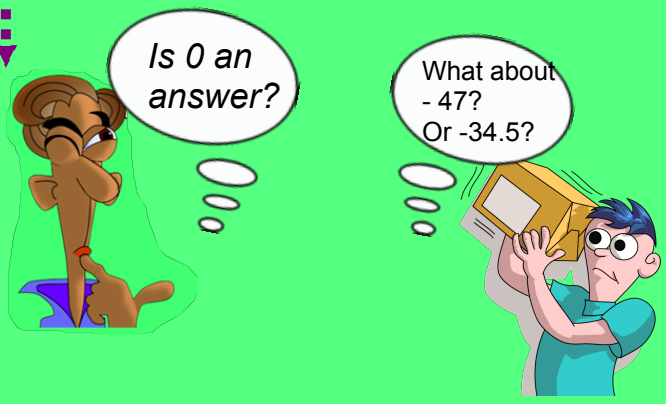
$$x + 7 = 15$$
$$x + 7 - 7 = 15 - 7$$
$$x = 8$$

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.

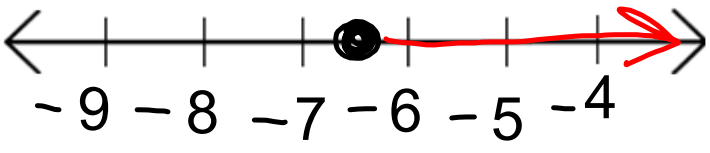
1. a) $x - 3.5 \geq -10$ $\overset{+ 3.5}{}$ $+ 3.5$

$x \geq -6.5$

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?

$x - 3.5 \geq -10$
$20 - 3.5 \geq -10$
$16.5 \geq -10$

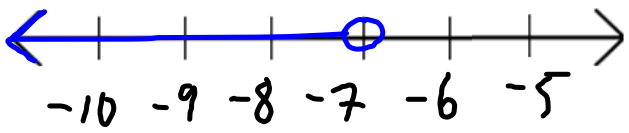
Try These!

2. $5 > m + 12$

$5 - 12 > m + 12 - 12$

$-7 > m$

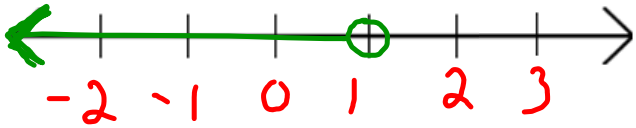
$m < -7$



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

$-2y + 3y < -3y + 1 + 3y$

$y < 1$



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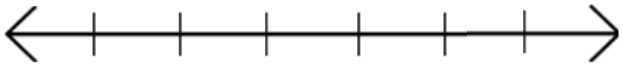
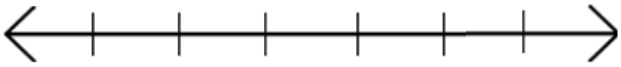
4. $-1 \geq 4 + h + 3.5$



5. $-4y + 7 < -5y + 1$



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

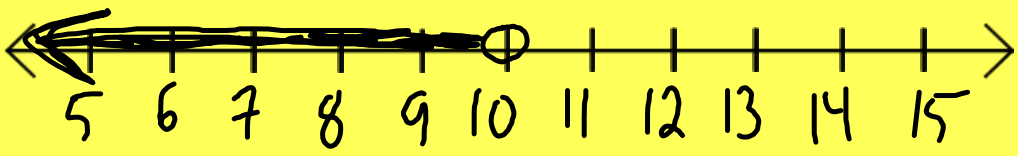
$$90 + 20h < 100 + 19h$$

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

$$90 + h < 100$$

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

$$\boxed{h < 10}$$



Match each inequality with the graph of its solution:

a) $x - 3 > 5$

$x - 3 + 3 > 5 + 3$

$x > 8$

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

$-6 \geq p$

$p \leq -6$

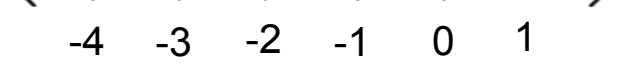
c) $7 < r + 8$

$-1 < r$

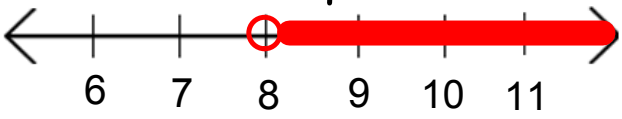
d) $-5 + w \leq -2$

$w \leq 3$

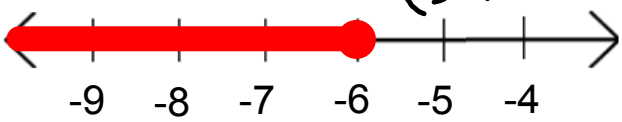
(c)



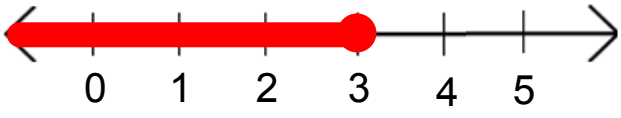
(a)



(b)



(d)



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