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:	Inequality:
$x + 7 = 15$	$x + 7 < 15$
$x + 7 - 7 = 15 - 7$	$x + 7 - 7 < 15 - 7$
$x = 8$	$x < 8$

One solution: x = 8

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

Is 0 an answer?

What about - 47? Or -34.5?

Solving an Inequality

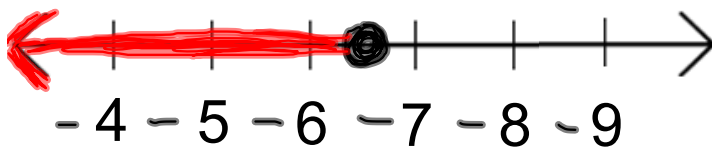a) Solve the inequality.
b) Verify the solution.
c) Graph the solution.

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

   $+ 3.5 \qquad + 3.5$

   $x \geq -6.5$

The solution is all numbers greater than or equal to 6.5

c) Graph:

$x \geq -6.5$

$-4 \ -5 \ -6 \ -7 \ -8 \ -9$

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.

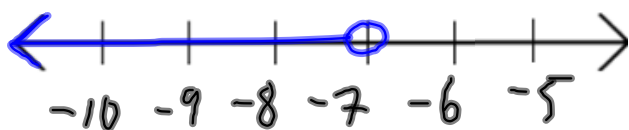What if we try 20?

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

2. $5 > m + 12$

$5 - 12 > m + 12 - 12$

$-7 > m$

$m < -7$

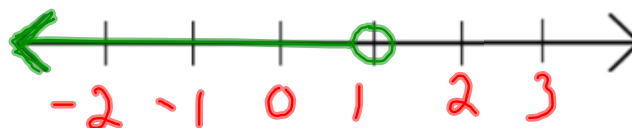
-10 -9 -8 -7 -6 -5

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

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

$y < 1$

-2 -1 0 1 2 3

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

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

$\longleftarrow\!\!+\!\!\!+\!\!\!+\!\!\!+\!\!\!+\!\!\!+\!\!\!\longrightarrow$ $\longleftarrow\!\!+\!\!\!+\!\!\!+\!\!\!+\!\!\!+\!\!\!+\!\!\!\longrightarrow$
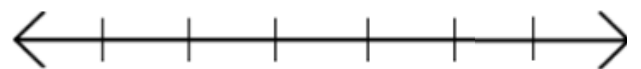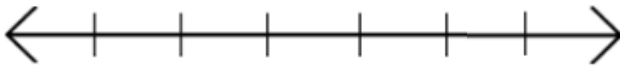
Solving Problems Using Inequalities:

Alison plans to rent a hall for her grad party.
- The Douglastown Rec Centre charges $90 plus $20 an hour.
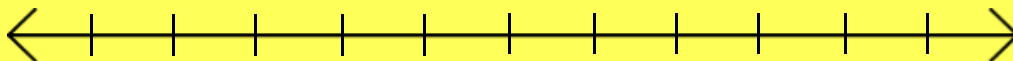- The Chatham Head Rec Centre charges $100 plus $19 an hour.

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

Solution:
Let h = number of hours
Douglastown: 90 + 20h   Chatham Head: 100 + 19h

90 + 20h < 100 + 19h
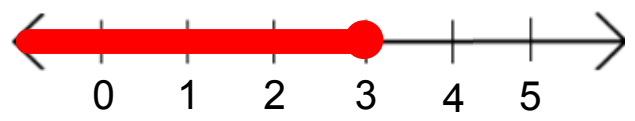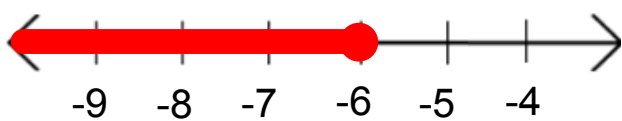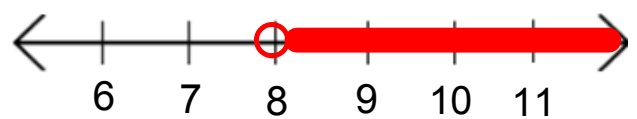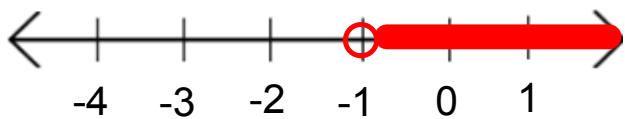
Match each inequality with the graph of its solution:

a) $x - 3 > 5$

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

c) $7 < r + 8$

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

Classwork / Homework:

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