Linear Inequalities

We use inequalities to model situations that can be described by a range of numbers instead of a single number.

"Pick a number greater than 7."

When one quantity is....

less than $<$

greater than $>$

less than or equal to $\leq$

greater than or equal to $\geq$

Which of these inequalities describes the time, *t* minutes, for which a car could be legally parked?

$t > 30$ $t \geq 30$

$t < 30$ $t \leq 30$

Define a variable and write an inequality for each of the following situation:

Variable:

Inequality:

Variable:

Inequality:

Variable:

Inequality:

Variable:

Inequality:

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#6 Write 4 numbers that are solutions of each inequality.

c) $7 > x$ Any 4 numbers smaller than 7

#11 a)For each situation, define a variable and write an inequality to describe the situation.
b)graph the solution.

iii) The minimum wage in Alberta is $8.40 an hour.

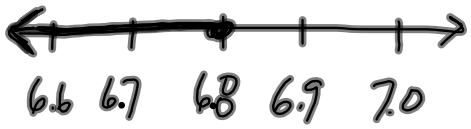
$x \geq 8.40$

#12 Write the inequality, are 1 and -3 solutions?

b) $x \leq 2$ yes and yes.

#13 Graph the solution of each inequality on a number line.

e) $b < 6.8$



Determining whether a number is a solution to an inequality

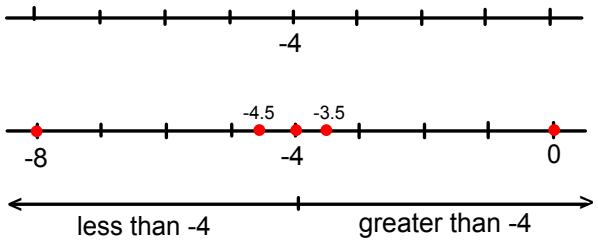
Is each number a solution of the inequality $b \geq -4$?

-8 -3.5 -4 -4.5 0

We can do this in TWO different ways:

Method 1: Using a Number Line

Show all numbers on a line.
The solution of $b \geq -4$ is all numbers that are greater than (to the right) or equal to -4.



For a number to be greater than -4, it must lie to the right of -4.

a) -8 is to the left of -4, so -8 is **not** a solution
b) -3.5 is to the right of -4 so -3.5 **is** a solution
c) -4 is equal to itself, so it **is** a solution
d) -4.5 is to the left of -4, so -4.5 is **not** a solution
e) 0 is to the right of -4, so 0 **is** a solution

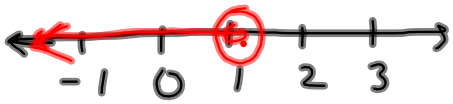
Method 2: Use Substitution.

Substitute each number for *b* in the inequality $b \geq -4$.

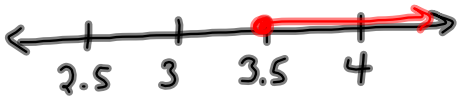
Determine whether the resulting inequality is true or false.

a) Since $-8 \geq -4$ is false, -8 is not a solution.
b) Since $-3.5 \geq -4$ is true, -3.5 is a solution.
c) Since $-4 = -4$, -4 is a solution.
d) Since $-4.5 \geq -4$ is false, -4.5 is not a solution.
e) Since $0 \geq -4$ is ture, 0 is a solution.

4 Practice problems (are you ready for your quiz?)

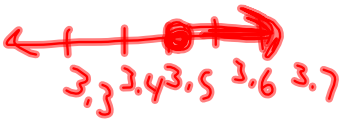
1) 

$x < 1$

2) 

$x \geq 3.5$

3) $a \geq 3.5$



4) $b < -5$