Section 3-5 Compound Inequalities

Compound Inequalities in Mathematics

Two inequalities connected with one of the following words:

AND OR

1. Write a compound inequality to represent this statement:
You must be at least 64 inches tall and no more than 77 inches tall to fly a military jet.

$H \geq 64$ AND $H \leq 77$

Can also be written as:

$64 \leq H \leq 77$

2. Write a compound inequality to represent this statement:
To get a discount ticket you can be up to 12 years old or you must be a minimum of 60 years old.

$A \leq 12$ OR $A \geq 60$

A compound inequality involving the word AND can be written two different ways.

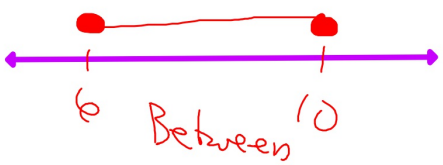
Model the following statement with a compound inequality and graph it on a number line.

All real numbers that are at least 6 and no more than 10

Inequality:

$X \geq 6$ AND $X \leq 10$

Graph:



$n \geq 6$ AND $n \leq 10$

I call this a between inequality.

It can be written as one statement:

$$6 \leq n \leq 10$$

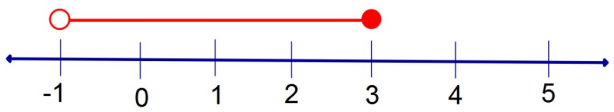
Since inequalities always point to the smaller number:
If you put the smaller number on the left and the bigger number on the right the two inequalities will always point to the left.

Write this statement as a compound inequality.

To get any kind of B for a grade you must get at least an 80 and be below a 90.

$80 \leq G < 90$

Write a compound inequality to model this graph:

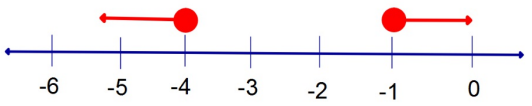


$-1 < H \leq 3$

Also can be written as two separate inequalities connected with AND

$H > -1$ AND $H \leq 3$

Write a compound inequality to model the graph below.



$X \leq -4$ OR $X \geq -1$

Compound Inequalities involving the word OR

CAN'T be written as one statement like compound inequalities using AND because

they are two parts of the number line that have no connection at all.

Write a compound inequality to describe the temperatures in °F for which water is in a liquid state of matter.

$32 < T < 212$

32 or below and water becomes ice (solid)

212 or above and water is steam (gas)

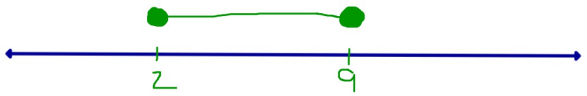
Write the following compound inequality as two separate inequalities.

$-13 < W < 20$

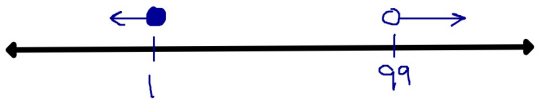
$W > -13$ AND $W < 20$

Graph each compound inequality on a number line.

$C \geq 2$ and $C \leq 9$



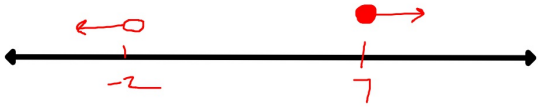
$w \leq 1$ or $w > 99$



Graph each compound inequality on a number line.

$-11 < M < 45$

$k < -2$ or $k \geq 7$



Solving compound inequalities.

Solve this compound inequality and graph the solution.

$6x + 1 < 25$ OR $4 - 5x < -36$

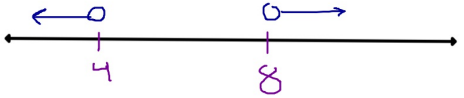
$-1 \quad -1$ $\quad$ $-4 \quad -4$

$\frac{6x}{6} < \frac{24}{6}$ $\quad$ $\frac{-5x}{-5} < \frac{-40}{-5}$

$x < 4$ $\quad$ $x > 8$

Sol: $x < 4$ OR $x > 8$

Graph:



Solve this compound inequality and graph the solution.

$4Q + 5 - 6Q \leq 12$ AND $10Q - 8 < 36$

$-2Q + 5 \leq 12$ $\quad$ $+8 \quad +8$

$-5 \quad -5$

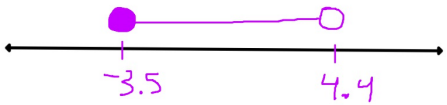
$\frac{-2Q}{-2} \leq \frac{7}{-2}$ $\quad$ $\frac{10Q}{10} < \frac{44}{10}$

$Q \geq -3.5$ $\quad$ $Q < 4.4$

Sol: $Q \geq -3.5$ and $Q < 4.4$

$-3.5 \leq Q < 4.4$

Graph:



Solve this compound inequality and graph the solution.

$17 < 2x + 1 \leq 35$

$-1 \quad -1 \quad -1$

$\frac{16}{2} < \frac{2x}{2} \leq \frac{34}{2}$

Sol: $8 < x \leq 17$

Graph:

You can now finish Hwk #16

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Problems 2, 3, 7, 12, 20, 21, 36-39, 51, 52