Algebra IA
Unit 4: Inequalities
Assignment 12

Solving Compound Inequalities

Steps:

① Break up the inequality so that there's only one $<$ $>$ $\leq$ $\geq$ sign (make it a union or intersection)
$\cup$/or  $\cap$/and 

② Solve each inequality.

③ Take the union or intersection of the sets.
 $\cup$/or  $\cap$/and

④ Test a possible number to see if it works.

Example:

① $\underbrace{-2 < -x}_{1}\underbrace{-10 < -4}_{2} \Rightarrow (-2 < -x-10) \overset{\text{and}}{\cap} (-x-10 < -4)$

$-2 < -x-10$ | $-x-10 < -4$
$+10 \quad +10$ add 10 | $+10 \quad +10$

$\frac{8}{-1} < \frac{-x}{-1}$ divide by -1 & switch sign. | $\frac{-x}{-1} < \frac{6}{-1}$

$-8 > x$ | $x > -6$

are there any #s < -8 $\overset{\text{and}}{\cap}$ > -6? **NO**

the solution is an empty set
(there is no solution)

Example:

① $\{x \mid \underbrace{-2 > -x-10}_{1} > \underbrace{-4}_{2}\} \Rightarrow (-2 > -x-10)_{1} \cap (-x-10 > -4)_{2}$

②

$-2 > -x-10$

$+10 \quad +10$

$8 > -x$

$-1 \quad -1$

$-8 < x$

add 10

divide by -1
* switch the sign ▽.

$-x-10 > -4$

$+10 \quad +10$

$-x > 6$

$-1 \quad -1$

$x < -6$

③

$\{x \mid -8 < x < -6\}$

④ according to our solution, x could = -7 ⇒ plug it in ▽.

$\{x \mid -2 > -x-10 > -4\}$

$-2 > -(-7)-10 > -4$

$-2 > 7-10 > -4$

$-2 > -3 > -4$

* this works ▽. *