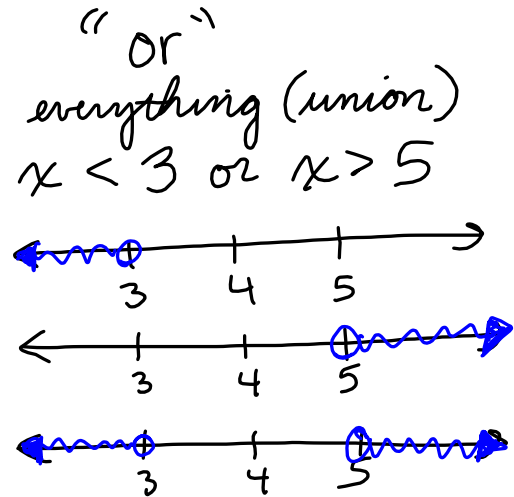
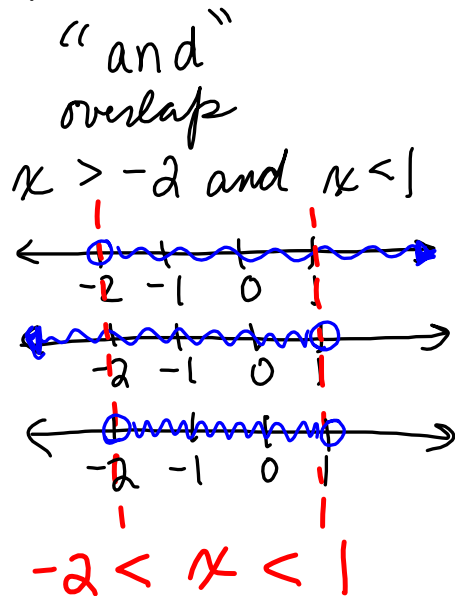


## Sec. 3.6 Compound Inequalities

Compound inequality: two distinct inequalities joined by the word *and* or the word *or*.

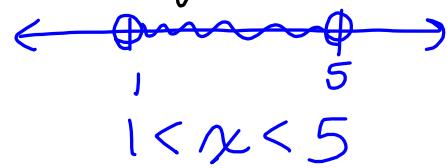


Problem 1: What compound inequality represents each given phrase?

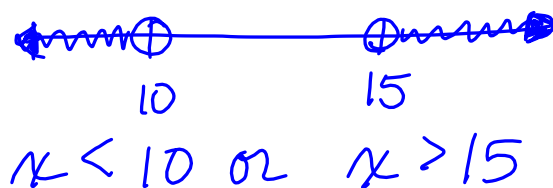
- a. all real numbers that are greater than 1 and less than 5

$$1 < x < 5$$

$$x > 1 \text{ and } x < 5$$



- b. all real numbers that are less than 10 or greater than 15.



Problem 2: What are the solutions of  $-2 < x + 2 \leq 5$ ? Graph the solutions.

$$\begin{array}{r} -2 < x + 2 \leq 5 \\ \underline{-2 \quad -2 \quad -2} \\ -4 < x \leq 3 \end{array}$$

$$\begin{array}{r} -2 < x + 2 \quad \text{and} \quad x + 2 \leq 5 \\ \underline{-2 \quad -2} \quad \quad \quad \underline{-2 \quad -2} \\ -4 < x \quad \text{and} \quad x \leq 3 \end{array}$$

Problem 3: What are the solutions to

$$2m - 1 < -3 \quad \text{or} \quad -3m + 2 < -4? \quad \text{Graph.}$$

$$\begin{array}{r} 2m - 1 < -3 \\ \underline{+1 \quad +1} \\ 2m < -2 \\ \underline{\quad \quad} \\ \frac{2m}{2} < \frac{-2}{2} \\ m < -1 \end{array} \quad \begin{array}{r} -3m + 2 < -4 \\ \underline{-2 \quad -2} \\ -3m < -6 \\ \underline{-3 \quad -3} \\ m > 2 \end{array}$$

$$\boxed{m < -1 \quad \text{or} \quad m > 2}$$



Problem 4: Recycling contest requires collecting between 83 and 87 pop tabs each week, inclusive.

Week 1: 82

Week 2: 86

Week 3: 84

Week 4: ?  $x$

$$83 \leq \frac{82+86+84+x}{4} \leq 87$$

$$4 \cdot 83 \leq \frac{252+x}{4} \leq 87.4$$

between 80  
and 96 tabs

$$\frac{332}{2} \leq 252+x \leq 348$$

$$\begin{array}{r} -252 \\ -252 \\ -252 \end{array}$$

---

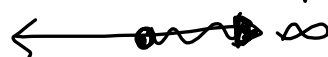

$$80 \leq x \leq 96$$

## Interval notation

parenthesis:  $<$ ,  $>$ , endpoint NOT included  
(open circle)  $-\infty$ ,  $\infty$

brackets:  $\leq$ ,  $\geq$ , endpoint IS included  
(closed circle)

infinity:  $\infty$  continues forever positive direction



$-\infty$  continues forever negative direction



Ex:  $x \geq 7$        $[7, \infty)$

$3 < x \leq 5$        $(3, 5]$

$(-\infty, 3]$         
3