

Variations on the 2.7 theme.

$$\begin{array}{r} |3x+2|-5 < 7 \\ \hline \phantom{|} +5 \phantom{=} +5 \\ \hline |3x+2| < 12 \end{array}$$

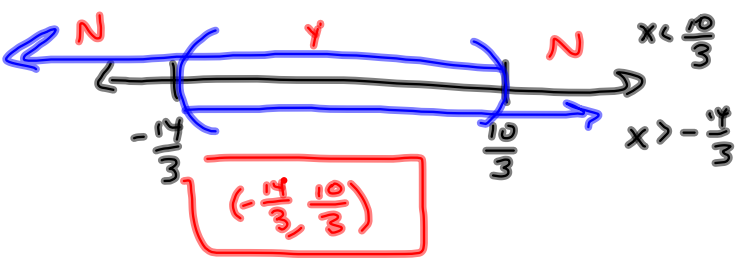
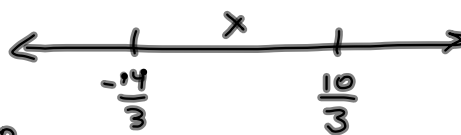
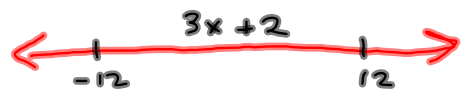
Empty the bucket.  
Reduce to previous case.

and conjunction  $\cap$   
or disjunction  $\cup$

$$\begin{array}{r} 3x+2 < 12 \\ -2 = -2 \\ \hline 3x < 10 \end{array} \quad \text{AND} \quad \begin{array}{r} 3x+2 > -12 \\ -2 = -2 \\ \hline 3x > -14 \end{array}$$

$$\left\{ x \mid x < \frac{10}{3} \quad \text{AND} \quad x > -\frac{14}{3} \right\}$$

set-builder answer.

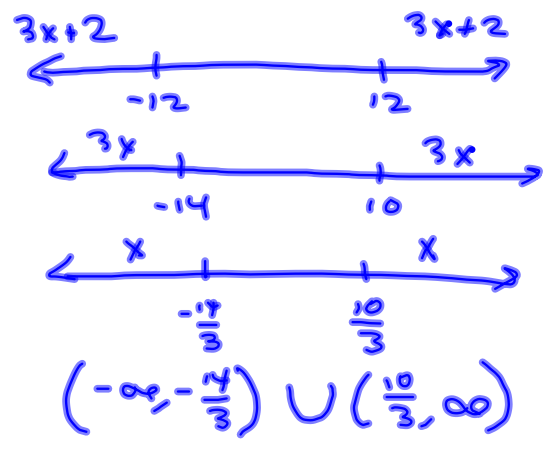
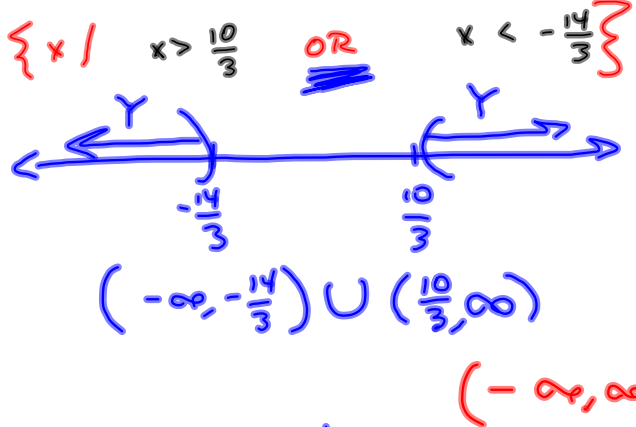


$$\begin{aligned} |3x+2| - 5 &> 7 \\ +5 &= +5 \\ \hline |3x+2| &> 12 \end{aligned}$$

In general  
 $|m| > \Delta$   
 $\rightsquigarrow > \Delta$  OR  $\rightsquigarrow < -\Delta$

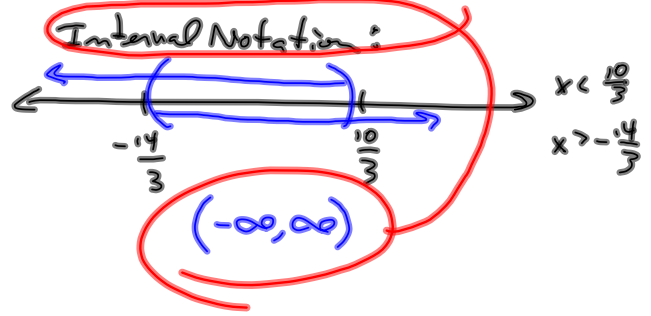
$3x+2 > 12$  OR  $3x+2 < -12$

$$\frac{-2 = -2}{3x > 10} \qquad 3x < -14$$

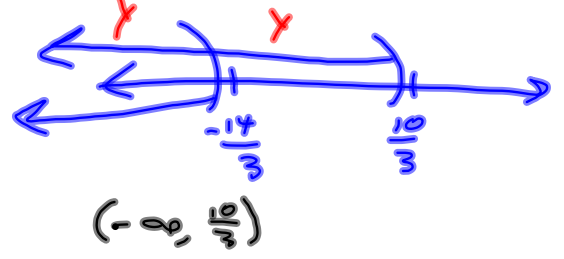


New prob:

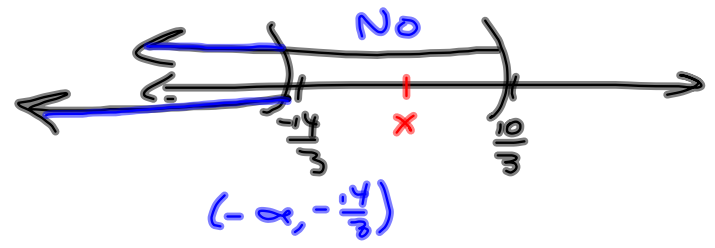
$\{x \mid x < \frac{10}{3}$  OR  $x > -\frac{14}{3}\}$



$\{x \mid x < \frac{10}{3}$  OR  $x < -\frac{14}{3}\}$



$\{x \mid x < \frac{10}{3}$  AND  $x < -\frac{14}{3}\}$



$x < \frac{10}{3}$  But  
 $x \neq -\frac{14}{3}$

CRAPPY FROM HERE TO ALMOST END

$$|3x+2| < 5x+1 \quad | \odot | < \Delta \Rightarrow$$

$$3x+2 < 5x+1 \text{ AND } 3x+2 > -(5x+1)$$

What else must be true, here?

Need  $5x+1 > 0$ , don't we?

$$( |3x+2| \geq 0 )$$

$$\odot < \Delta \text{ AND } \odot > -\Delta$$

$$| \odot | >$$

OR

$$| \odot | <$$

AND

Bonus.

$$|3x+2| < |5x+1|$$

Don't care about  $5x+1 > 0$ , now.

$$3x+2 < 5x+1 \text{ and } 3x+2 > -(5x+1)$$

$$|3x+2| < |5x+1|$$

$$3x+2 < |5x+1|$$

$$\text{and } 3x+2 > -|5x+1|$$

$$|5x+1| > 3x+2$$

$$-|5x+1| < 3x+2$$

$$5x+1 > 3x+2 \text{ OR } 5x+1 < -(3x+2)$$

$$\Rightarrow |5x+1| > -(3x+2)$$

$$5x+1 > -3x-2 \text{ OR } 5x+1 < 3x+2$$

$$|3x+2| < |5x+1|$$

$$3x+2 < 5x+1 \quad \text{and} \quad 3x+2 > -(5x+1)$$

$$\underline{-2 = -2}$$

$$3x < 5x - 1$$

$$\underline{-5x < -5x}$$

$$-2x < -1$$

$$x > \frac{1}{2}$$

$$3x+2 > -5x-1$$

$$\underline{-2 = -2}$$

$$3x > -5x - 3$$

$$\underline{5x = +5x}$$

$$8x > -3$$

$$x > -\frac{3}{8}$$

AND

$$\left\{ x \mid x > \frac{1}{2} \text{ and } x > -\frac{3}{8} \right\}$$

