

Notes: Solving and Graphing Compound Inequalities

Solve and graph each simple inequality.

1) $2n + 6 < 5n - 3$

$$\begin{array}{r} -2n \quad -2n \\ \hline 6 < 3n - 3 \\ +3 \quad +3 \\ \hline 9 < 3n \end{array}$$

$$\frac{9}{3} < \frac{3n}{3}$$

$$3 < n$$

$$n > 3$$

2) $2(3n + 1) \leq 5n$

$$\begin{array}{r} 6n + 2 \leq 5n \\ -6n \quad -6n \\ \hline 2 \leq -n \\ -2 \geq n \end{array}$$

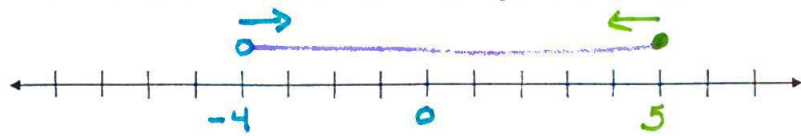
$$n \leq -2$$

Compound Inequalities:

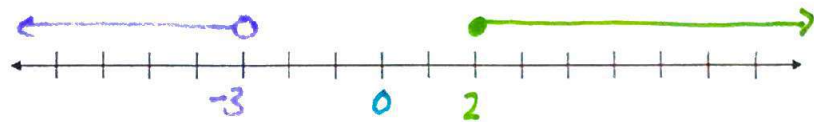
→ when two simple inequalities are combined into one statement by the words **AND** or **OR**.

$-4 < x \leq 5$

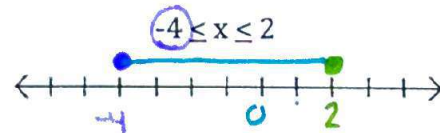
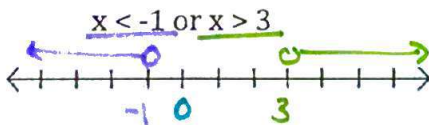
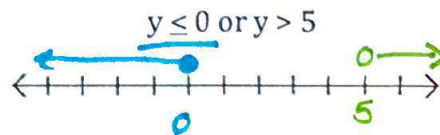
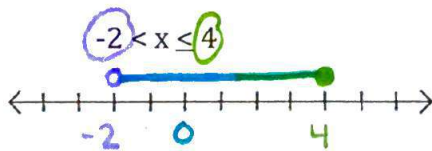
$x > -4$ and $x \leq 5$



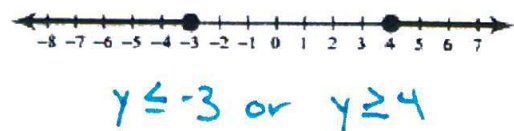
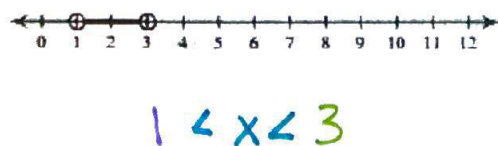
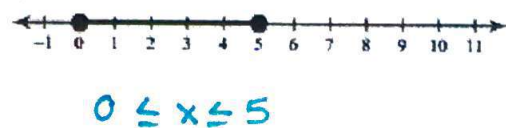
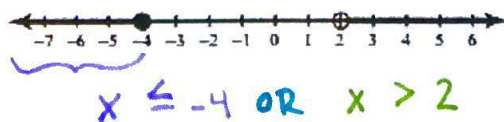
$y \geq 2$ or $y < -3$



Graph the solution.

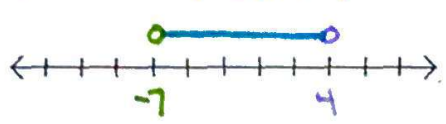
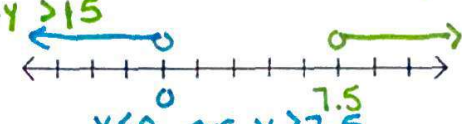

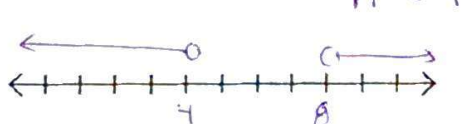
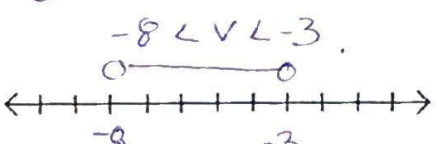
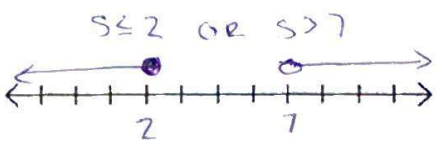


Write the solution as a compound inequality



Solving Compound Inequalities

→ Cover up what you're not solving for!

$-15 < x - 8 < -4$ $\begin{array}{r} -15 < x - 8 \\ +8 \quad +8 \\ \hline -7 < x \\ x > -7 \end{array}$ $\begin{array}{r} x - 8 < -4 \\ +8 \quad +8 \\ \hline x < 4 \end{array}$ $-7 < x < 4$ 	$\frac{1}{3}y - \frac{1}{2} > 2 \text{ or } 6y + 2 < 2$ $\begin{array}{r} \frac{1}{3}y - \frac{1}{2} > 2 \\ \times 6 \\ \hline 2y - 3 > 12 \\ +3 \quad +3 \\ \hline 2y > 15 \\ y > 7.5 \end{array}$ $\begin{array}{r} 6y + 2 < 2 \\ -2 \quad -2 \\ \hline 6y < 0 \\ y < 0 \end{array}$ $y < 0 \text{ or } y > 7.5$ 
$-2 \leq 3b + 7 \leq 13$ $\begin{array}{r} -2 \leq 3b + 7 \\ -7 \quad -7 \\ \hline -9 \leq 3b \\ \frac{-9}{3} \leq \frac{3b}{3} \\ -3 \leq b \\ b \geq -3 \end{array}$ $\begin{array}{r} 3b + 7 \leq 13 \\ -7 \quad -7 \\ \hline 3b \leq 6 \\ b \leq 2 \end{array}$ $-3 \leq b \leq 2$ 	$12 + 4n > 44 \text{ or } 10 - 12n > -38$ $\begin{array}{r} 12 + 4n > 44 \\ -12 \quad -12 \\ \hline 4n > 32 \\ n > 8 \end{array}$ $\begin{array}{r} 10 - 12n > -38 \\ -10 \quad -10 \\ \hline -12n > -48 \\ \frac{-12n}{-12} > \frac{-48}{-12} \\ n < 4 \end{array}$ 
$-10 - 2v < 6 \text{ and } 6v + 12 < -6$ $\begin{array}{r} -10 - 2v < 6 \\ +10 \quad +10 \\ \hline -2v < 16 \\ v > -8 \end{array}$ $\begin{array}{r} 6v + 12 < -6 \\ -12 \quad -12 \\ \hline 6v < -18 \\ v < -3 \end{array}$ $-8 < v < -3$ 	$2s + 3 \leq 7 \text{ OR } 3s + 5 > 26$ $\begin{array}{r} 2s + 3 \leq 7 \\ -3 \quad -3 \\ \hline 2s \leq 4 \\ s \leq 2 \end{array}$ $\begin{array}{r} 3s + 5 > 26 \\ -5 \quad -5 \\ \hline 3s > 21 \\ s > 7 \end{array}$ $s \leq 2 \text{ or } s > 7$ 

Word Problems

A local company is hiring trainees with less than 1 year of experience and managers with 5 or more years of experience. Graph the solutions.



$$0 < x < 1 \text{ or } x \geq 5$$

Marty's allowance is doubled and is now between \$10 and \$15, inclusive. What amounts could his allowance have been before the increase?

$$10 \leq 2x \leq 15$$

$$\frac{10}{2} \leq \frac{2x}{2}$$

$$5 \leq x$$

$$x \geq 5$$

$$2x \leq 15$$

$$x \leq 7.5$$

$$5 \leq x \leq 7.5$$