

Chapter 6 § 4

Solving Compound Inequalities

Definition

Compound Inequalities – Two inequalities connected by ‘and’ or ‘or’.

Intersection – A compound inequality containing ‘and’.

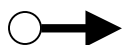
Union – A compound inequality containing ‘or’.

Reminder:

When the variable is on the left side



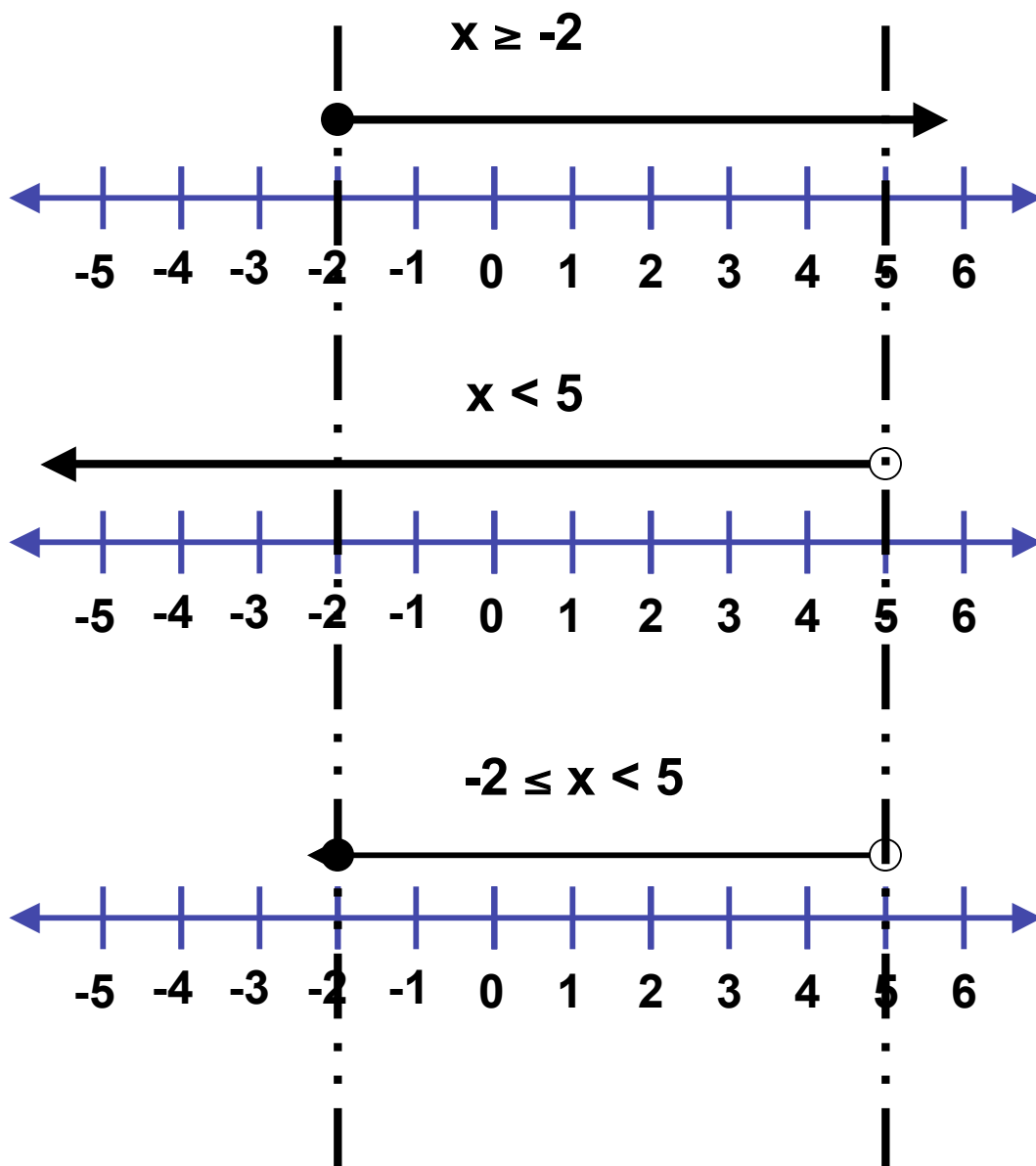
When the variable is on the right side



Let's talk about inequalities that intersect

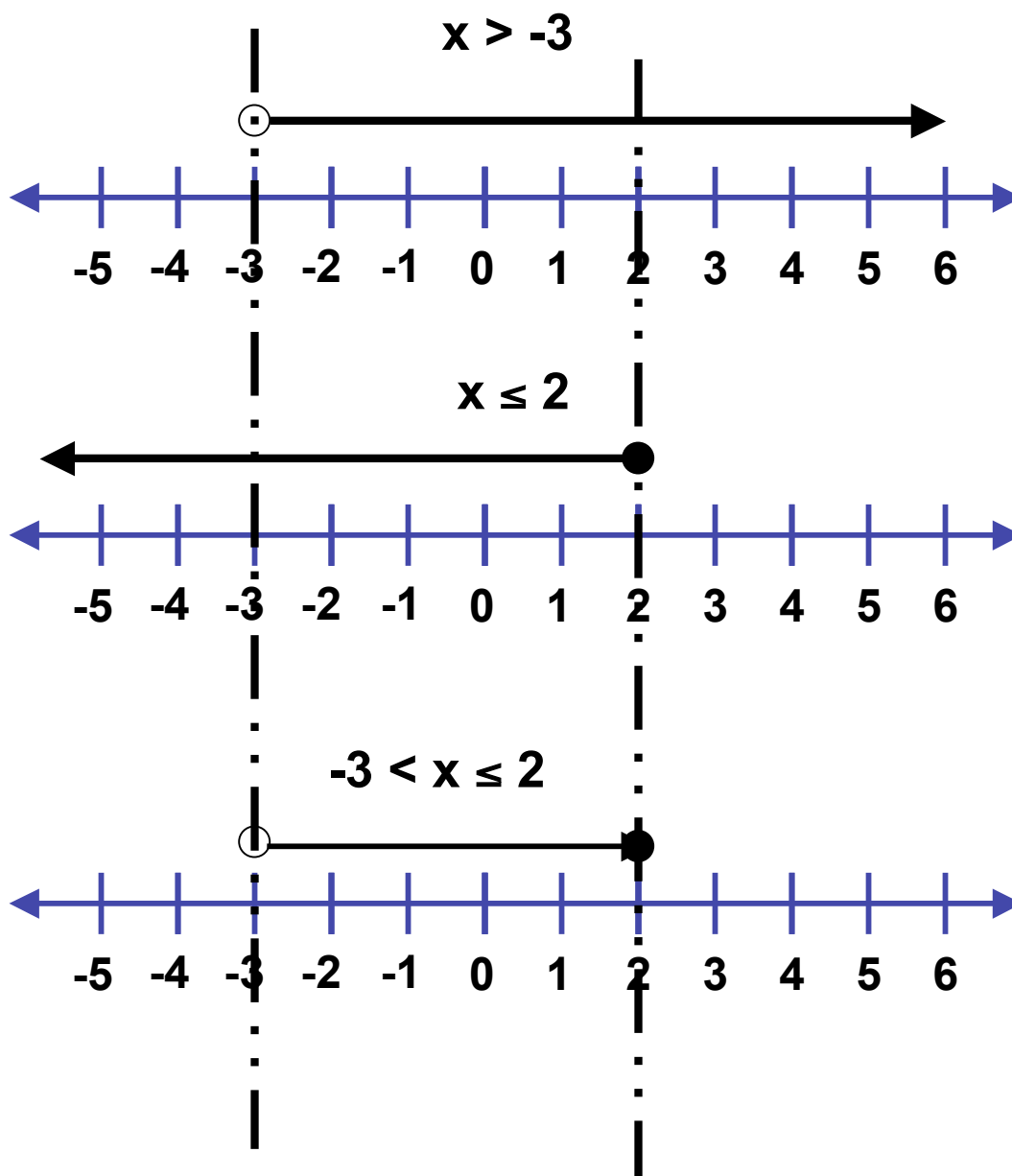
Graph the solution $x \geq -2$ and $x < 5$.

This can also be written as $-2 \leq x < 5$.



Graph the solution $x > -3$ and $x \leq 2$.

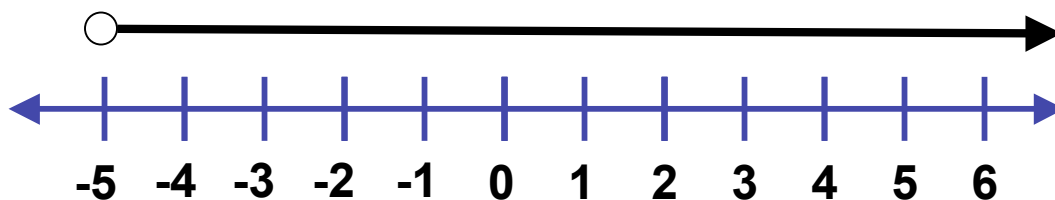
This can also be written as $-3 < x \leq 2$.



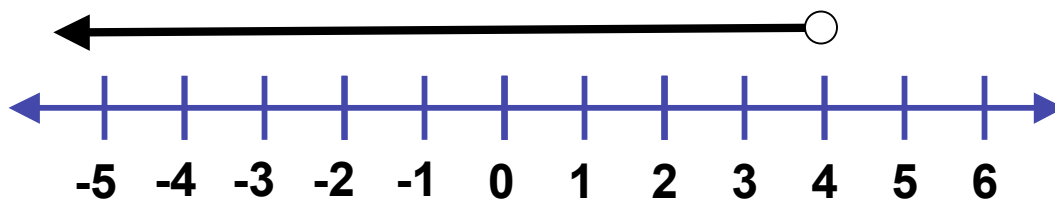
Graph the solution $x > -5$ and $x < 4$.

This can also be written as $-5 < x < 4$.

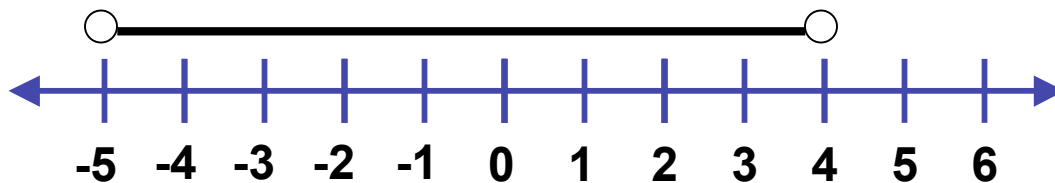
$$x > -5$$



$$x < 4$$



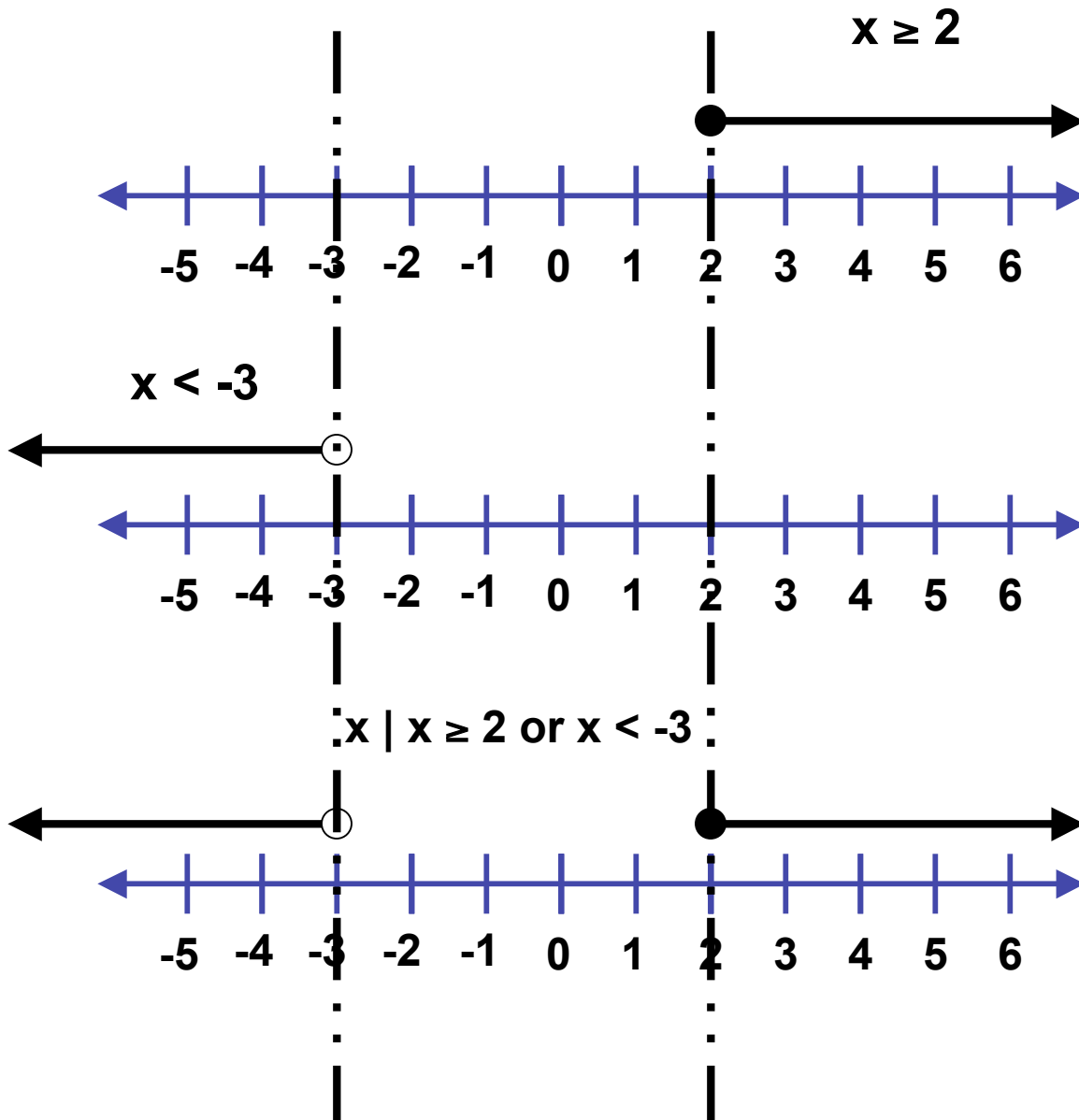
$$-5 < x < 4$$



Let's talk about inequalities that Union.

Graph the solution $x \geq 2$ or $x < -3$.

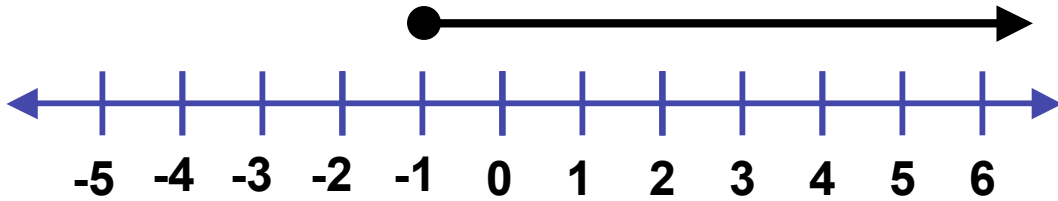
This can also be written as $x \mid x \geq 2$ or $x < -3$.



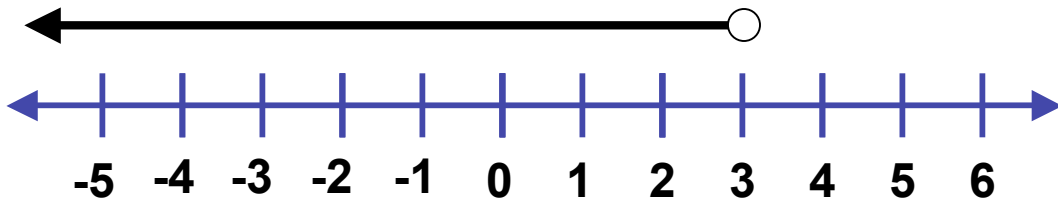
Graph the solution $x \geq -1$ or $x < 3$.

This can also be written as $x \mid x \geq -1$ or $x < 3$.

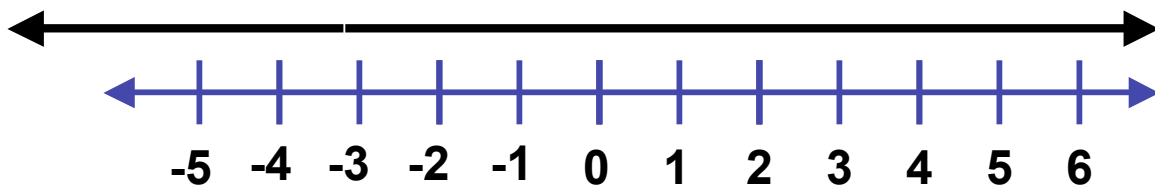
$$x \geq -1$$



$$x < 3$$



$$x \mid x \text{ is a real number}$$



Let's add some Red Pepper

Solve

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

$$-1 < x + 3$$

$$\begin{array}{r} -3 \quad -3 \\ \hline \end{array}$$

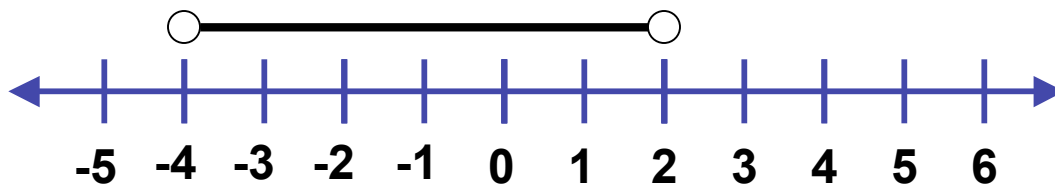
$$-4 < x$$

$$x + 3 < 5$$

$$\begin{array}{r} -3 \quad -3 \\ \hline \end{array}$$

$$x < 2$$

$$-4 < x < 2$$



Solve

$$-3 < x - 2 \leq 0$$

$$-3 < x + (-2)$$

$$\frac{2}{2} \quad \frac{2}{2}$$

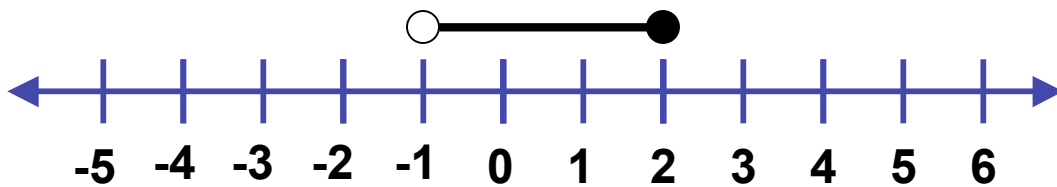
$$-1 < x$$

$$x + (-2) \leq 0$$

$$\frac{2}{2} \quad \frac{2}{2}$$

$$x \leq 2$$

$$-1 < x \leq 2$$



Let's add some White Pepper

Solve

$$3w + 8 < 2 \quad \text{or} \quad w + 12 > 2 - w$$

$$3w + 8 < 2$$

$$\begin{array}{r} -8 \quad -8 \\ \hline \end{array}$$

$$\begin{array}{r} 3w < -6 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \quad 3 \\ \hline \end{array}$$

$$w < -2$$

$$w + 12 > 2 + (-w)$$

$$\begin{array}{r} w \qquad \qquad \qquad w \\ \hline \end{array}$$

$$2w + 12 > 2$$

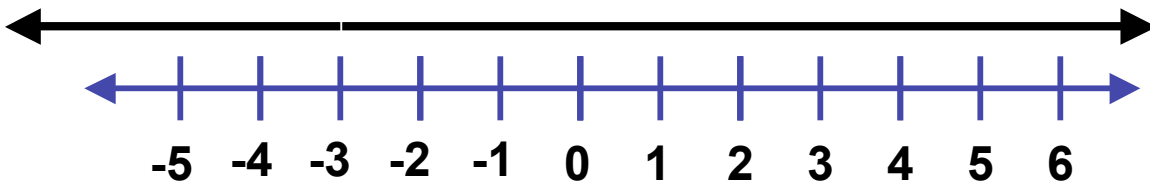
$$\begin{array}{r} -12 \quad -12 \\ \hline \end{array}$$

$$\begin{array}{r} 2w > -10 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \quad 2 \\ \hline \end{array}$$

$$w > -5$$

$w \mid w$ is a real number



Solve

$$3m > m + 4 \text{ or } -2m > m - 6$$

$$3m > m + 4$$

$$\frac{-m \quad -m}{\quad \quad \quad}$$

$$\frac{2m > 4}{\quad \quad \quad}$$

$$\frac{2}{2} \quad \frac{4}{2}$$

$$m > 2$$

$$-2m > m + (-6)$$

$$\frac{-m \quad -m}{\quad \quad \quad}$$

$$\frac{-3m > -6}{\quad \quad \quad}$$

$$\frac{-3}{-3} \quad \frac{-6}{-3}$$

$$m < 2$$

$$m \mid m > 2 \text{ or } m < 2$$

