Section 5.4
COMPOUND INEQUALITIES

A compound inequality consists of two inequalities connected by "*and* " or "*or* ".

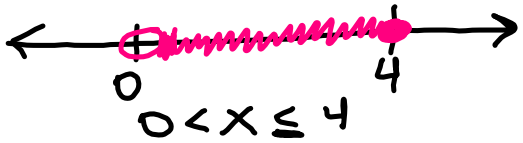
and: must satisfy both solutions (what they have in common)

or: both solutions work (combining them)

Example 1

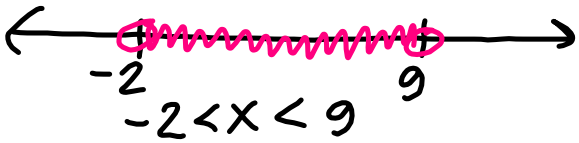
Write an inequality that represents the statement and graph.

a. *x* is greater than 0 and less than or equal to 4



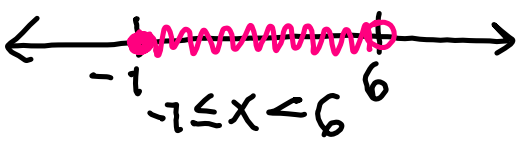
$0 < x \leq 4$

b. *x* is less than 9 and greater than -2



$-2 < x < 9$

c. *x* is at least -1 and less than 6

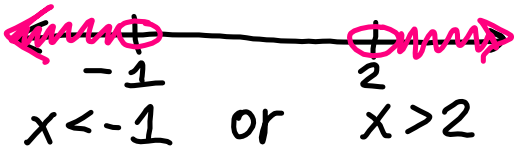


$-1 \leq x < 6$

Example 2

Write an inequality that represents the statement and graph.

a. *x* is less than -1 or greater than 2



$x < -1$ or $x > 2$

b. *x* is greater than or equal to 5 or less than 0

$x < 0$ or $x \geq 5$

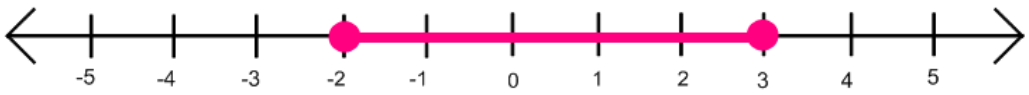
c. *x* is less than 7 or at least 12

$x < 7$ or $x \geq 12$

Example 3

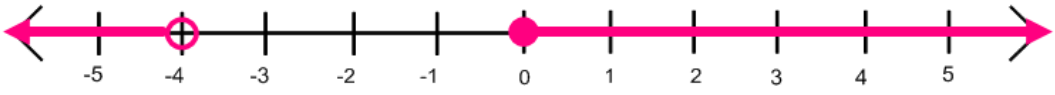
Write an inequality that describes the graph.

a.



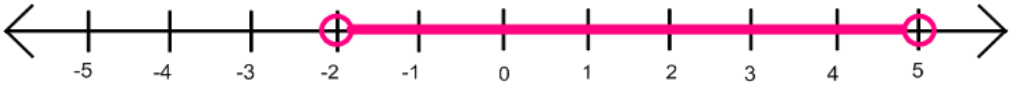
$-2 \leq x \leq 3$

b.



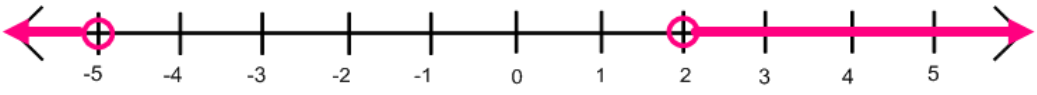
$x < -4$ or $x \geq 0$

c.



$-2 < x < 5$

d.

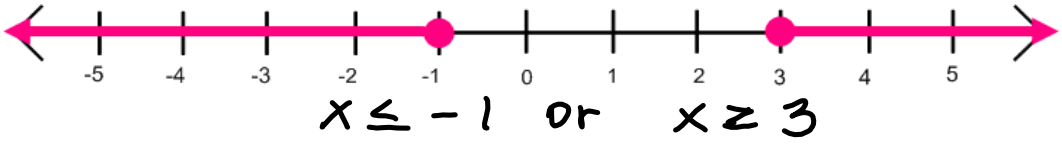


$x < -5$ or $x > 2$

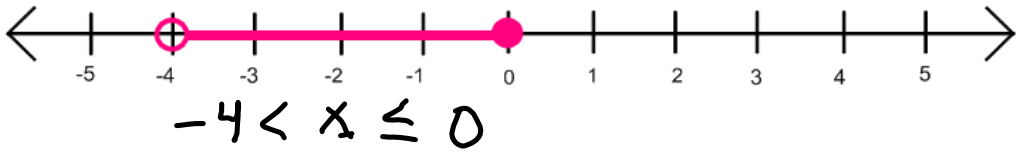
Example 4

Write an inequality that describes the graph.

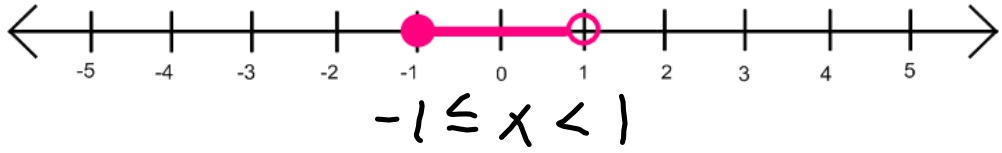
a.



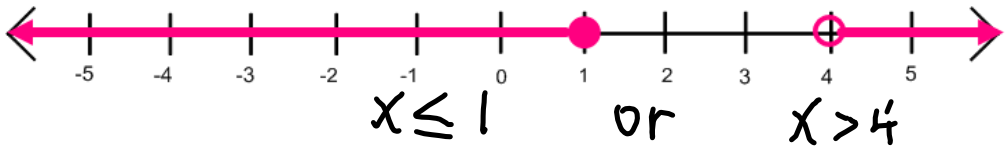
b.



c.

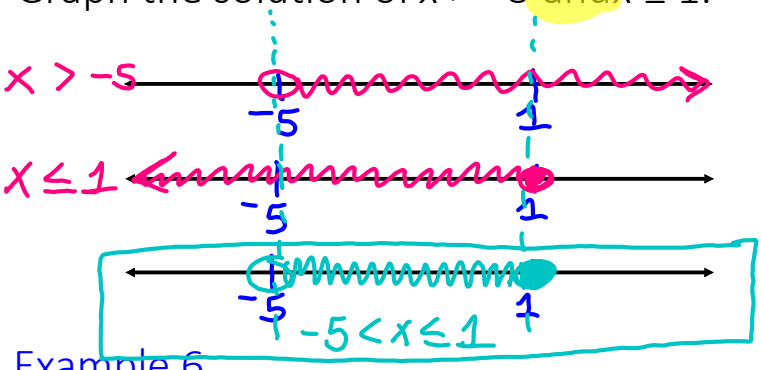


d.



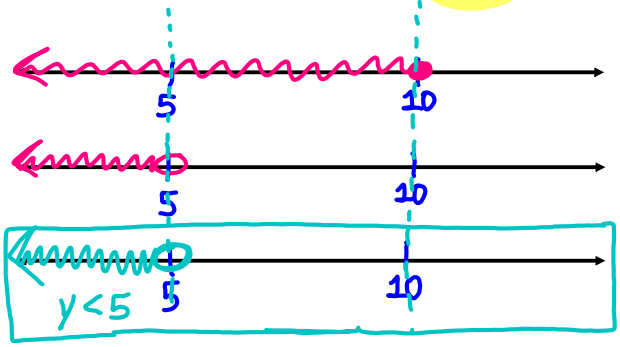
Example 5

Graph the solution of $x > -5$ and $x \leq 1$.



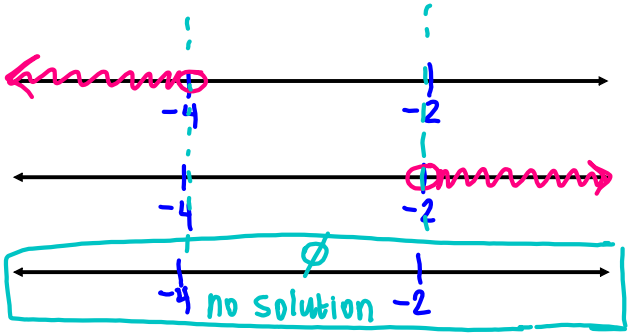
Example 6

Graph the solution of $y \leq 10$ and $y < 5$.



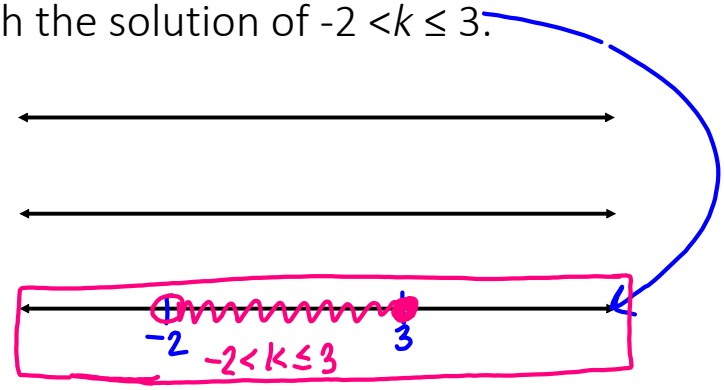
Example 7

Graph the solution of $m < -4$ and $m > -2$.



Example 8

Graph the solution of $-2 < k \leq 3$.

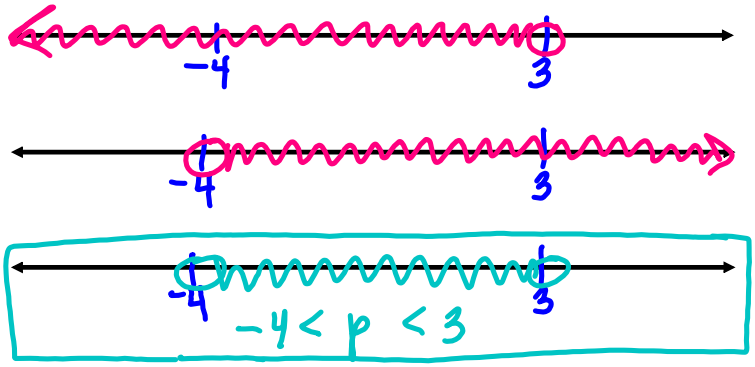


Example 9

Solve $p - 4 < -1$ and $p + 5 > 1$. Graph.

$+4 \quad +4 \qquad -5 \quad -5$

$p < 3$ and $p > -4$

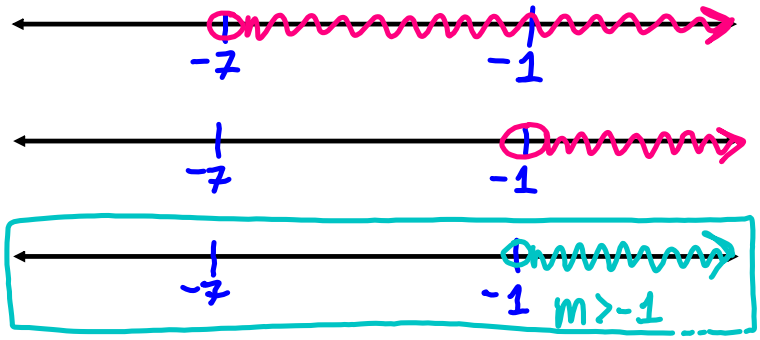


Example 10

Solve $m + 8 > 1$ and $m - 1 > -2$. Graph.

$-8 \quad -8 \qquad +1 \quad +1$

$m > -7$ and $m > -1$



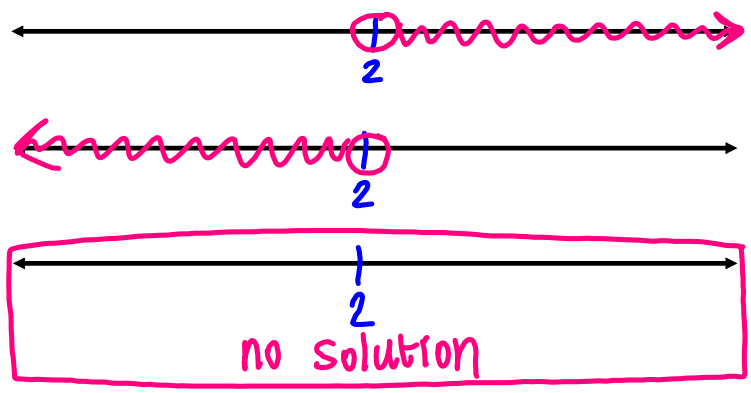
Example 11

Solve $3h > h + 4$ and $-2h > h - 6$. Graph.

$-h \quad -h \qquad -h \quad -h$

$\frac{2h}{2} > \frac{4}{2} \qquad \frac{-3h}{-3} > \frac{-6}{-3}$

$h > 2$ and $h < 2$



Example 12

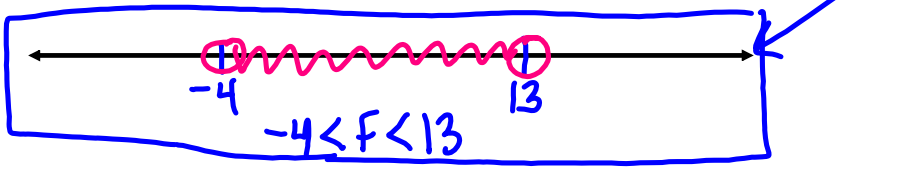
Solve $-16 < 2f - 8 < 18$. Graph.

$+8 \quad +8 \quad +8$

$-8 < 2f < 26$

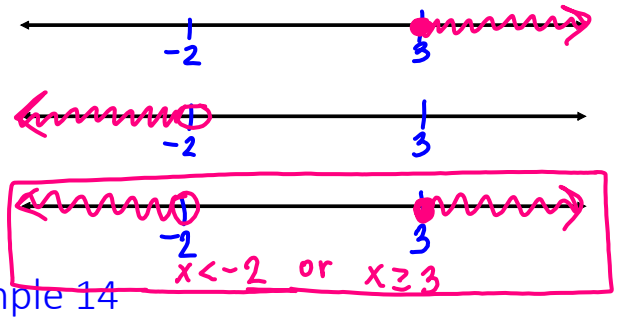
$\frac{-8}{2} < \frac{2f}{2} < \frac{26}{2}$

$-4 < f < 13$



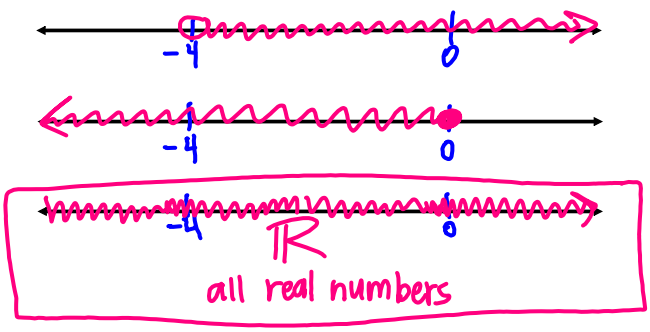
Example 13

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



Example 14

Graph the solution of $w > -4$ or $w \leq 0$.

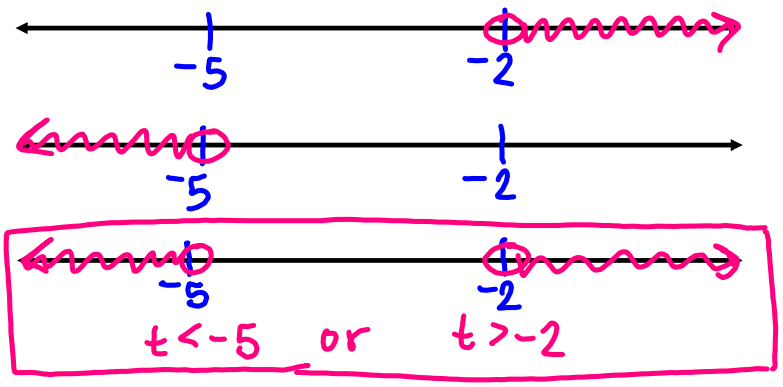


Example 15

Solve $t - 2 > -4$ or $-3t > 15$. Graph.

$+2 \quad +2$ $\qquad$ $\frac{-3t}{-3} > \frac{15}{-3}$

$t > -2$ or $t < -5$



Example 16

Solve $2d > d - 3$ or $3d < d + 6$. Graph.

$-d \quad -d$ $\qquad$ $-d \quad -d$

$d > -3$ $\qquad$ $\frac{2d}{2} < \frac{6}{2}$

or $\quad d < 3$