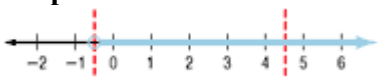
Lesson 6-4

Example 1 Graph an Intersection
Graph the solution set of $x > -0.5$ and $x < 4.5$.



Graph $x > -0.5$.

Graph $x < 4.5$.

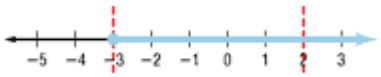
Find the intersection.

The solution set is $\{x \mid -0.5 < x < 4.5\}$. Note that the graph of $x > -0.5$ does *not* include the point –0.5. The graph of $x < 4.5$ does *not* include 4.5.

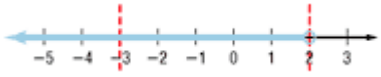
Example 2 Solve and Graph an Intersection
Solve $-3 \le 3x + 6 < 12$. Then graph the solution set.
First express $-3 \le 3x + 6 < 12$ using *and*. Then solve each inequality.

$-3 \le 3x + 6$	and	$3x + 6 < 12$
$-3 - 6 \le 3x + 6 - 6$		$3x + 6 - 6 < 12 - 6$
$-9 \le 3x$		$3x < 6$
$\frac{-9}{3} \le \frac{3x}{3}$		$\frac{3x}{3} < \frac{6}{3}$
$-3 \le x$		$x < 2$

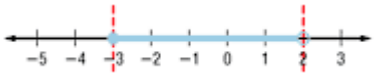
The solution set is the intersection of the two graphs.



Graph $-3 \le x$ or $x \ge -3$.



Graph $x < 2$.



Find the intersection.

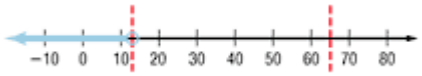
The solution set is $\{x \mid -3 \le x < 2\}$.

Example 3 Write and Graph a Compound Inequality
A movie theater charges different prices for different ages. A child under 13 is $5.95, an adult 13 to 65 is $8.95 while a senior citizen (65 and older) pays $5.95. Write and graph an inequality that describes the ages that will pay $5.95.

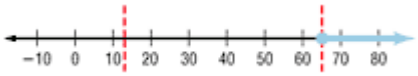
Words A child under 13 will pay $5.95 and a senior citizen 65 and older will pay $5.95.
Variable Let a be the age that will pay $5.95.
Inequality

age	is less than	13	or	age	is greater than or equal to	65
a	$<$	13	or	a	$\geq$	65

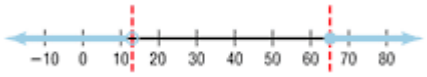
Now, graph the solution set.



Graph $a < 13$.



Graph $a \geq 65$.



Find the union.

$a < 13$ or $a \geq 65$

Example 4 Solve and Graph a Union

Solve $2a - 1 > 13$ or $-6a + 11 \geq -1$. Then graph the solution set.

$2a - 1 > 13$ or $-6a + 11 \geq -1$

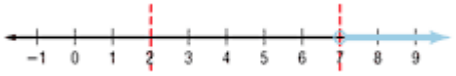
$2a - 1 + 1 > 13 + 1$ $\quad -6a + 11 - 11 \geq -1 - 11$

$2a > 14$ $\quad -6a \geq -12$

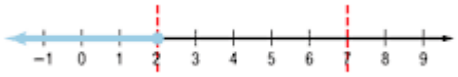
$\frac{2a}{2} > \frac{14}{2}$ $\quad \frac{-6a}{-6} \leq \frac{-12}{-6}$

$a > 7$ $\quad a \leq 2$

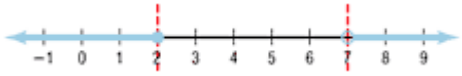
The solution set is the union of the two graphs.



Graph $a > 7$.



Graph $a \leq 2$.



Find the Union.

The solution set is $\{a \mid a \leq 2 \text{ or } a > 7\}$.