#### 12.4 Inequalities

An **inequality Sta**tes that quantities either are not equal or may not be equal. An inequality uses one of the following symbols:

Symbol	Meaning	Word Phrases
<	is less than	Fewer than, below
>	is greater than	More than, above
≤	is less than or equal to	At most, no more than
2	is greater than or equal to	At least, no less than

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Write an inequality for each situation.

A. There are at least 15 people in the waiting room.

 $\chi \geq 15$  people

B. The tram attendant will allow no more than 60 people on the tram.

x ≤ 60 people

- A. There are at most 10 gallons of gas in the tank.
- B. There is at least 10 yards of fabric left.

$$\chi \geq 10 \, \text{ya}$$

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An inequality that contains a variable is an algebraic inequality. A value of the variable that makes the inequality true is a solution of the inequality.

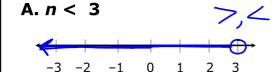
An inequality may have more than one solution. Together, all of the solutions are called the **solution set**.

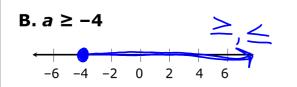
You can graph the solutions of an inequality on a number line. If the variable is "greater than" or "less than" a number, then that number is indicated with an open circle.

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## Graph each inequality.





## Graph each inequality.

 $A. p \leq 2$ 



B. e > -2



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#### Write an inequality for each situation.

1. No more than 220 people are in the theater.

$$\chi \leq 220$$
 people **2.** There are at least a dozen eggs left.

$$\gamma \geq 12 \text{ eggs}$$

3. Fewer than 14 people attended the meeting.



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A <u>compound inequality</u> is the result of combining two inequalities. The words *and* and or are used to describe how the two parts are related.

x > 3 or x < -1

 $-2 < v^{-2}$ 

x is either greater than 3 or less than-1.

y is both greater than -2 and less than 4. y is between -2 and 4.

#### **Writing Math**

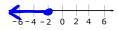
The compound inequality -2 < y and y < 4can be written as -2 < y < 4.

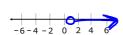
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### Graph each compound inequality.

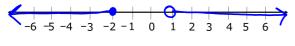
 $m \leq -2 \text{ or } m > 1$ 

First graph each inequality separately.





Then combine the graphs.

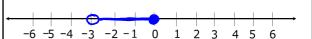


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#### Graph each compound inequality

 $-3 < b \le 0$  can be written as the inequalities

-3 < b and  $b \le 0$ . Graph each inequality separately.



### Reading Math

-3 < b is the same as b > -3.

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#### Graph each compound inequality.

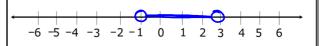
w < 2 or  $w \ge 4$ 



Graph the inequalities.

 $4. \times -3 \le w < 4$ -6 -5 -4 -3 -2 -1

5.  $x \ge 4$  or x < -1  $- | < \chi < 3$ 



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