

LESSON  
16

# Solving Inequalities and Graphing Solutions

**Review It!**

When you solve inequalities and graph solutions, remember this word:

**inequality** a math sentence that uses  $<$ ,  $>$ ,  $\leq$ , or  $\geq$  to show that two quantities are not equal

Solve  $x + 8 < 13$  and graph the solution.

Step 1 Solve the inequality.

$$x + 8 < 13$$

**REMEMBER** Solve inequalities the same way you solve equations.

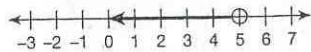
$$x + 8 - \underline{\quad} < 13 - \underline{\quad}$$

$$x < \underline{\quad}$$

**REMEMBER**  $<$  means "is less than."

Step 2 Graph the solution.

The solution is all numbers that are \_\_\_\_\_ than \_\_\_\_\_.



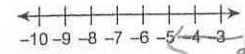
**REMEMBER** Graph an open circle at the endpoint of the solution set.

So, the graph of the solution  $x < \underline{\quad}$  is a ray pointing \_\_\_\_\_ with an open circle at \_\_\_\_\_.

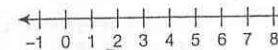
**Try It!**

Graph each inequality on the number line.

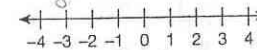
1.  $x \geq -6$



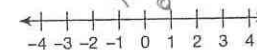
2.  $x \leq 7$



3.  $x > -3$



4.  $x < 1$



Solve each inequality.

5.  $5x > -20$

$$x > -4$$

6.  $x - 8 < 12$

$$x < 20$$

7.  $x + 9 \geq 23$

$$x \geq 14$$

8.  $\frac{x}{3} \leq 19$

$$x \leq 57$$

9.  $6x - 1 \geq -19$

$$x \geq -3$$

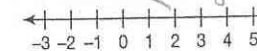
10.  $2x + 7 \leq 39$

$$x \leq 16$$

Solve each inequality and graph the solution.

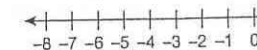
11.  $3x + 1 < 13$

$$x < 4$$



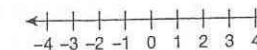
12.  $5x - 2 > -32$

$$x > -6$$



13.  $4x + 1 \geq -11$

$$x \geq -3$$



**Ask Yourself**

1.

How should you graph  $\geq$ ?  
open circle, or closed circle?

5.

What is the first step?  
divide by 5, or add 20?

11.

What shape is the solution?  
line, or ray?

**On Your Own!**

Circle the answer for each question.

1. Solve:  $x - 29 > 58$

- A.  $x > 87$   $x - 29 + 29 > 58 + 29$
  - B.  $x < 87$
  - C.  $x > 29$
  - D.  $x < 29$
- $x > 87$

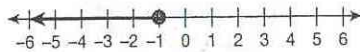
2. Solve:  $4x \leq -48$

- A.  $x \geq -52$
  - B.  $x \geq -12$
  - C.  $x \leq -12$
  - D.  $x \leq -52$
- $4x \leq -48$   
 $x \leq -12$

3. Solve:  $2x + 19 \geq 51$

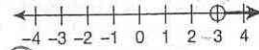
- A.  $x \leq 35$
  - B.  $x \geq 35$
  - C.  $x \leq 16$
  - D.  $x \geq 16$
- $2x \geq 51 - 19$   
 $2x \geq 32$   
 $x \geq \frac{32}{2}$   
 $x \geq 16$

4. Which inequality is graphed below?



- A.  $x < -1$
- B.  $x \leq -1$
- C.  $x \geq -1$
- D.  $x > -1$

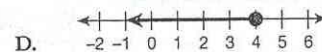
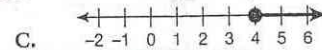
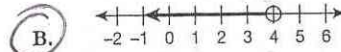
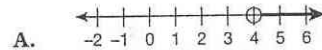
5. Which inequality is graphed below?



- A.  $x > 3$
- B.  $x \leq 3$
- C.  $x \geq 3$
- D.  $x < 3$

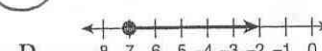
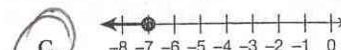
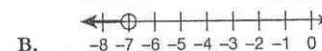
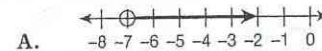
6. Which graph shows the solution of this inequality?

$3x + 9 < 21$   $3x < 12$   
 $x < 4$



7. Which graph shows the solution of this inequality?

$2x - 1 \leq -15$   $2x \leq -14$   
 $x \leq -7$

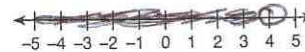


8.  $9x - 13 < 23$

Part A Solve the inequality.

$9x - 13 < 23$   
 $9x < 23 + 13$   
 $9x < 36$   
 $x < 4$

Part B Graph the solution.



**Math Words**

Fill in the blanks.

- 9. The graph of an inequality with  $<$  or  $>$  shows a ray with a(n) open circle.
- 10. The graph of an inequality with  $\leq$  or  $\geq$  shows a ray with a(n) closed circle.
- 11. A math sentence that uses  $<$ ,  $>$ ,  $\leq$ , or  $\geq$  is a(n) inequality.

Algebra