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.

$x + 8 < 13$

$x + 8 - \_\_\_\_ < 13 - \_\_\_\_$

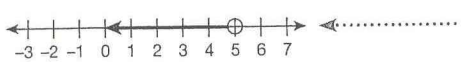
$x < \_\_\_\_$

REMEMBER Solve inequalities the same way you solve equations.

REMEMBER $<$ means "is less than."

Step 2 Graph the solution.

The solution is all numbers that are _____ than _____.



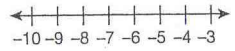
REMEMBER Graph an open circle at the endpoint of the solution set.

So, the graph of the solution $x <$ _____ is a ray pointing _____ with an open circle at _____.

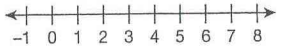
Try It! Graph each inequality on the number line.

Ask Yourself

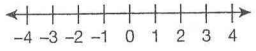
1. $x \geq -6$



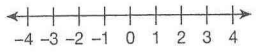
2. $x \leq 7$



3. $x > -3$



4. $x < 1$



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

Solve each inequality.

5. $5x > -20$ _____

6. $x - 8 < 12$ _____

7. $x + 9 \geq 23$ _____

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

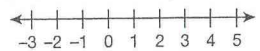
8. $\frac{x}{3} \leq 19$ _____

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

10. $2x + 7 \leq 39$ _____

Solve each inequality and graph the solution.

11. $3x + 1 < 13$



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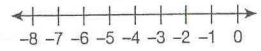
11. What shape is the solution? line, or ray?

12. $5x - 2 > -32$



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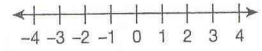
13. $4x + 1 \geq -11$



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On Your Own!

Circle the answer for each question.

1. Solve: $x - 29 > 58$

   A. $x > 87$
   B. $x < 87$
   C. $x > 29$
   D. $x < 29$

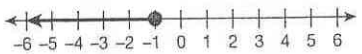
2. Solve: $4x \leq -48$

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

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

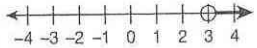
   A. $x \leq 35$
   B. $x \geq 35$
   C. $x \leq 16$
   D. $x \geq 16$

4. Which inequality is graphed below?



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

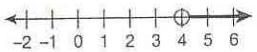
5. Which inequality is graphed below?

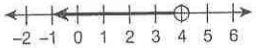


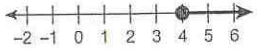
   A. $x > 3$
   B. $x \leq 3$
   C. $x \geq 3$
   D. $x < 3$

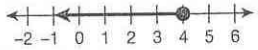
6. Which graph shows the solution of this inequality?

$$3x + 9 < 21$$

   A. 

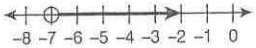
   B. 

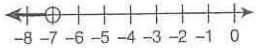
   C. 

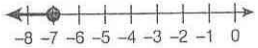
   D. 

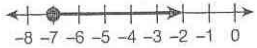
7. Which graph shows the solution of this inequality?

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

   A. 

   B. 

   C. 

   D. 

8. $9x - 13 < 23$

Part A Solve the inequality.

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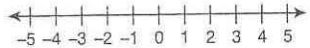
Part B Graph the solution.



Math Words

Fill in the blanks.

9. The graph of an inequality with $<$ or $>$ shows a ray with a(n) _____ circle.

10. The graph of an inequality with $\leq$ or $\geq$ shows a ray with a(n) _____ circle.

11. A math sentence that uses $<$, $>$, $\leq$, or $\geq$ is a(n) _____.