

Solve and Graph Inequalities

Lesson 7-6

Name: _____

Date: _____

Class: _____

Key Vocabulary

Level 1 support

Picture first, then the word, then a plain-language meaning. Say each word out loud.

$x + 3 > 10 \rightarrow$ subtract 3 $\rightarrow x > 7$ — any number greater than 7 works

Solve

To find the number that makes it true.

$x > 7$: open circle at 7, shade right — shows all solutions at a glance

Graph

To show answers on a number line with circles and shading.

$x = 8$ is a solution to $x > 7$ because $8 > 7$ is true; $x = 5$ is not because $5 > 7$ is false

Solution

A number that makes the equation or inequality true.

Substitute $x = 5$ into $x + 3 > 10$: $5 + 3 = 8$, and $8 > 10$ is false, so $x = 5$ is not a solution

Substitute

To put a number in for the letter to check if it works.

Key Ideas & Notes

- Detective Kim knows that the suspect withdrew more than \$50 from an ATM.
- The amount plus a \$3 fee totaled more than \$53.
- She writes $x + 3 > 53$ and needs to solve for x , then graph the solution set to share with the bank.
- How can she find and display all possible withdrawal amounts?
- Solve each inequality using inverse operations, then graph the solution on the number line.

Think About It

- What is the unknown in this situation?
- What operation do you need to undo?
- Will the answer be one number or many numbers?

My Notes

Guided Examples

Example 1

Solve: $x + 6 > 14$

Solution: Subtract 6 from both sides: $x > 14 - 6 = 8$. Graph: open circle at 8, shade right.

Answer: A. $x > 8$

Example 2

Solve: $x - 9 \leq 3$

Solution: Add 9 to both sides: $x \leq 3 + 9 = 12$. Graph: closed circle at 12, shade left.

Answer: A. $x \leq 12$

Example 3

Solve: $x + 10 \geq 25$

Solution: Subtract 10 from both sides: $x \geq 25 - 10 = 15$. Graph: closed circle at 15, shade right.

Answer: A. $x \geq 15$

Write About the Math

The Writing Revolution

I can explain my work using the words solve, graph, solution, and substitute.

1. Kernel Sentence subject + verb

Model: Solve is to find the number that makes it true.

Resolver es encontrar el número que la hace verdadera.

Write a kernel sentence about solve. Use a subject and a verb.

Escribe una oración base sobre resolver. Usa un sujeto y un verbo.

2. Sentence Expansion because · but · so

Kernel: Solve matters in math

Resolver importa en matemáticas

Expand the kernel three ways. Add a reason, a contrast, and a result.

because
porque

Solve matters in math because ____.

Resolver importa en matemáticas porque ____.

but
pero

Solve matters in math, but ____.

Resolver importa en matemáticas, pero ____.

so
entonces

Solve matters in math, so ____.

Resolver importa en matemáticas, entonces ____.

3. Sentence Types 4 ways to write a math idea

Statement
Afirmación

Tell one true fact about solve.
Di un hecho verdadero sobre solve.

Solve ____.

Question
Pregunta

Ask a question about solve.
Haz una pregunta sobre solve.

How does ____ ?
¿Cómo ____ ?

Exclamation
Exclamación

Show excitement about solve.
Muestra entusiasmo sobre solve.

Wow, ____ !
¡Guau, ____ !

Command
Mandato

Tell a partner what to do with solve.
Dile a un compañero qué hacer con solve.

First, ____ .
Primero, ____ .

4. Explain Your Reasoning use a sentence starter

First I solved by ____ .
Primero resolví al ____ .

Then I graphed ____ .
Luego grafiqué ____ .

This keeps me within ____ .
Esto me mantiene dentro de ____ .

Try It

Solve on your own. Check the answer key when you are done.

1. Solve: $x - 4 < 11$

- A. $x < 15$
- B. $x < 7$
- C. $x > 15$
- D. $x = 15$

Show your work:

2. Is $x = 5$ a solution to $x + 4 > 12$?

- A. No, because $5 + 4 = 9$, and 9 is not greater than 12
- B. Yes, because $5 + 4 = 9$
- C. Yes, because $5 > 4$
- D. No, because $5 < 12$

Show your work:

Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

A detective has a budget of at most \$100 for supplies. She already spent \$37 on gloves. Write an inequality for the remaining amount r she can spend, solve it, graph it, and name three possible values for r .

Sentence starter: Inequality: $37 + r \leq \underline{\hspace{1cm}}$. Solving: $r \leq \underline{\hspace{1cm}} - 37 = \underline{\hspace{1cm}}$. Graph: $\underline{\hspace{1cm}}$ circle at $\underline{\hspace{1cm}}$, shade $\underline{\hspace{1cm}}$. Three possible values: $\underline{\hspace{1cm}}$.

Show your work:

Reflect — Exit Ticket

Solve and describe the graph: $x + 5 < 11$

- A. $x < 6$; open circle at 6, shade left
- B. $x < 16$; open circle at 16, shade left
- C. $x \leq 6$; closed circle at 6, shade left
- D. $x > 6$; open circle at 6, shade right

Your answer:

Answer Key & Teacher Guide

1. **Try It 1:** A. $x < 15$ — *Add 4 to both sides: $x < 11 + 4 = 15$. Graph: open circle at 15, shade left.*
2. **Try It 2:** A. No, because $5 + 4 = 9$, and 9 is not greater than 12 — *Substitute: $5 + 4 = 9$. Since $9 > 12$ is false, $x = 5$ is NOT a solution.*
3. **Exit Ticket:** A. $x < 6$; open circle at 6, shade left — *Subtract 5 from both sides: $x < 11 - 5 = 6$. Open circle at 6 (not included), shade left. ✓*

Writing (TWR) — what to look for

- **Kernel sentence:** A complete sentence needs a subject and a verb. Example: Solve is to find the number that makes it true.
- **Expansion:** *because* gives a reason, *but* shows a contrast or exception, *so* shows a result. Answers vary; each must keep the kernel idea and add the correct kind of detail.
- **Sentence types:** Statement ends with a period, question with "?", exclamation with "!", and a command starts with an action verb (a "bossy" verb).