UNIT 7 · STANDARD 6.EE.8

Graph Inequalities

Lesson 7-5

Name: _____ Date: _____ Class: _____

Key Vocabulary Level 1 support

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

A horizontal line with marks at 0, 1, 2, 3, … showing where values fall

Number line

A line with numbers in order. You use it to show answers.

x > 5: open circle at 5 means 5 itself is NOT a solution, but 5.1, 6, 7, … are

Open circle

An empty circle showing a number is NOT included.

x ≥ 5: closed circle at 5 means 5 IS a solution, and so are 6, 7, 8, …

Closed circle

A filled-in circle showing a number IS included.

For x > 3, the solution set includes 3.1, 4, 5, 10, 100 — any number greater than 3

Solution set

All the numbers that make the inequality true.

Key Ideas & Notes

- Detective Okafor is building a timeline.
- The suspect was seen at the scene no earlier than 2:00 PM, meaning the arrival time t satisfies t ≥ 2.
- She needs to plot this on a timeline to share with her team.
- How should she mark the number line?
- Graph each inequality on the number line. Decide whether to use an open or closed circle, then shade in the correct direction.

Think About It

- What does 'no earlier than 2:00 PM' mean about the time?
- Should 2:00 PM itself be included?
- Which direction on the number line would you shade?

My Notes

Guided Examples

Example 1

Which graph represents x < 5?

Solution: x < 5 means 5 is NOT included (open circle) and values less than 5 are shaded (left).

Answer: A. Open circle at 5, shaded left

Example 2

Which graph represents x ≥ 3?

Solution: x ≥ 3 means 3 IS included (closed circle) and values greater than or equal to 3 are shaded (right).

Answer: A. Closed circle at 3, shaded right

Example 3

Which graph represents x > 8?

Solution: x > 8 means 8 is NOT included (open circle) and values greater than 8 are shaded to the right.

Answer: A. Open circle at 8, shaded right

Write About the Math

The Writing Revolution

I can explain my graph using the words number line, open circle, closed circle, and solution set.

1. Kernel Sentence

subject + verb

Model: Number line is a line with numbers in order. You use it to show answers.
Recta numérica es una línea con números en orden. La usas para mostrar respuestas.

Write a kernel sentence about number line. Use a subject and a verb.
Escribe una oración base sobre recta numérica. Usa un sujeto y un verbo.

_____

_____

2. Sentence Expansion

because · but · so

Kernel: Number line matters in math
Recta numérica importa en matemáticas

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

because
porque

Number line matters in math because ____.
Recta numérica importa en matemáticas porque ____.

_____

but
pero

Number line matters in math, but ____.
Recta numérica importa en matemáticas, pero ____.

_____

so
entonces

Number line matters in math, so ____.
Recta numérica importa en matemáticas, entonces ____.

_____

3. Sentence Types

4 ways to write a math idea

Statement
Afirmación

Tell one true fact about number line.
Di un hecho verdadero sobre number line.

Number line ____.

Question
Pregunta

Ask a question about number line.
Haz una pregunta sobre number line.

How does ____ ?
¿Cómo ____ ?

Exclamation
Exclamación

Show excitement about number line.
Muestra entusiasmo sobre number line.

Wow, ____ !
¡Guau, ____ !

Command
Mandato

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

First, ____ .
Primero, ____ .

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4. Explain Your Reasoning

use a sentence starter

I used a ____ circle because ____.
Usé un círculo ____ porque ____.

The arrow points ____ because ____.
La flecha apunta ____ porque ____.

This shows a limit like ____.
Esto muestra un límite como ____.

Try It

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

1. Which graph represents x ≤ 10?

A. Closed circle at 10, shaded left

B. Open circle at 10, shaded left

C. Closed circle at 10, shaded right

D. Open circle at 10, shaded right

Show your work:

2. A number line shows a closed circle at 8 and is shaded to the left. Which inequality does this represent?

A. $x \leq 8$

B. $x < 8$

C. $x \geq 8$

D. $x > 8$

Show your work:

Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

A theme park has two rides. Ride A requires height h > 48 inches. Ride B requires height h ≥ 48 inches. A child is exactly 48 inches tall. Which ride can they go on? Explain using number line graphs for both inequalities.

Sentence starter: For Ride A (h > 48), the graph has a ____ circle at 48. Since 48 > 48 is ____, the child ____ ride A. For Ride B (h ≥ 48), the graph has a ____ circle at 48. Since 48 ≥ 48 is ____, the child ____ ride B.

Show your work:

Reflect — Exit Ticket

How would you graph the inequality x ≥ 9?

A. Closed circle at 9, shaded right

B. Open circle at 9, shaded right

C. Closed circle at 9, shaded left

D. Open circle at 9, shaded left

Your answer:

Answer Key & Teacher Guide

1. **Try It 1:** A. Closed circle at 10, shaded left — *$x \leq 10$ means 10 IS included (closed circle) and values less than or equal to 10 are shaded (left).*
2. **Try It 2:** A. $x \leq 8$ — *Closed circle means the value is included (≤ or ≥). Shaded left means less than or equal to: $x \leq 8$.*
3. **Exit Ticket:** A. Closed circle at 9, shaded right — *$x \geq 9$ means 9 is included (closed circle) and values are 9 or greater (shaded right).*

Writing (TWR) — what to look for

- **Kernel sentence:** A complete sentence needs a subject and a verb. Example: Number line is a line with numbers in order. You use it to show answers.
- **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).