Unit 4, Lesson 3

Decimales en rectas numéricas

Standards

Addressing **4.NF.C, 4.NF.C.7**

Instructional Routines

- Which Three Go Together?

Goals

- Explain (orally) strategies for comparing decimals to hundredths and express comparisons using >, <, =.

Student Facing Learning Goals

Comparemos algunos decimales.

Lesson Purpose

The purpose of this lesson is for students to reason about and compare the size of decimals using a number line.

Narrative

Prior to this lesson, students made sense of tenths and hundredths in decimal notation. They also analyzed and wrote equivalent decimals. In this lesson, students use number lines to reason about the relative size of two or more decimals. The reasoning here is similar to that in an earlier unit, when students used number lines to compare fractions. Students see that, just as before, they can learn about the relative size of decimals by considering their positions on a number line and their relationship to benchmarks such as 0, 0.5, and 1. They will use these insights to compare and order fractions in the next lesson.

Students attend to precision and use the structure of the number line (MP6, MP7) when they locate and label decimals between two tick marks representing tenths. For example, halfway between 0.4 and 0.5 will be the decimal 0.45 whereas 0.48 will be much closer to 0.5 than to 0.4.

Access for Students with Disabilities

- Action and Expression

Access for English Learners

- MLR8

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	15 min
Synthesis Estimate	10 min
Actividad de cierre	5 min

Teacher Reflection Questions

In earlier units, students compared fractions using many different strategies, including comparing fractions to benchmarks and creating equivalent fractions. Where did you see evidence of students making connections to those reasoning strategies in this lesson?

Warm-up

10 min

Cuáles tres van juntos: Decimales

Standards

Addressing **4.NF.C**

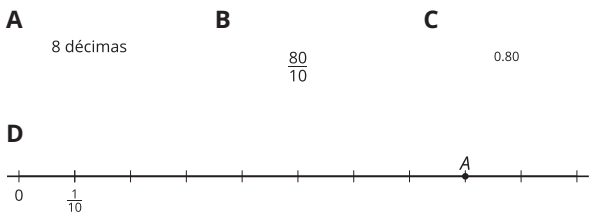
Instructional Routines

- Which Three Go Together?

This *Warm-up* prompts students to carefully analyze and compare different representations of numbers. In making comparisons, they solidify their understanding of the connections across representations and have a reason to use language precisely (MP6). The activity also enables the teacher to hear the terminologies students know and how they talk about characteristics of the representations.

Student Task Statement

¿Cuáles 3 van juntas?



Student Response

Sample Responses:

- A, B, and C go together because they have 8.
- A, B, and D go together because they have tenths.
- A, C, and D go together because they are equivalent to $\frac{8}{10}$.
- B, C, and D go together because they are expressed in numerals instead of words.

Launch

- Groups of 2
- Display the image.
- *"Escojan 3 que vayan juntas. Prepárense para compartir por qué van juntas"* // "Pick 3 that go together. Be ready to share why they go together."
- 1 minute: quiet think time

Activity

- *"Discutan con su compañero lo que pensaron"* // "Discuss your thinking with your partner."
- 2–3 minutes: partner discussion
- Share and record responses.

Activity Synthesis

- *"¿Cómo podríamos ajustar una o más opciones para que todas representen el mismo valor?"* // "How might we revise one or more of the options so that they all represent the same value?" (Sample responses:
  - Change the $\frac{80}{10}$ to $\frac{8}{10}$ or $\frac{80}{100}$.
  - Change Option A to say "eight," Option C to say "8" or "8.0," and the label for the first tick mark in Option D to say "1.")

Activity 1

Puntos en rectas numéricas

20 min
PLC Activity

Standards

Addressing **4.NF.C.7**

In this activity, students reason about the relative size of decimals by locating them on a number line. Students rely on their experience of locating fractions on a number line and the relationship of the decimal values relative to 0 and 1.

If desired and logistically feasible, consider carrying out the activity on a giant number line rather than on paper.

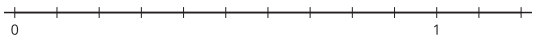
- Stretch a long strip of tape across a wall, at least 8 or 10 feet long. Partition the tape into 12 equal intervals, using shorter pieces of tape as tick marks. Label the locations of 0 and 1.
- Give each group of students 2–3 dot stickers, 4–5 sticky notes, and a thick marker.
- Ask each group to write (on sticky notes) labels for two of the tick marks, with one sticky note for each label.
- Assign each group one or two of the eight decimals in the second problem. Ask them to locate their assigned decimals on the number line, using dot stickers to mark the location and sticky notes to label them.

Access for Students with Disabilities

Action and Expression: Internalize Executive Functions. Synthesis: Invite students to plan a strategy, including the tools they will use, for the first two steps of the activity. If time allows, invite students to share their plan with a partner before they begin.
Supports accessibility for: Organization, Social-Emotional Functioning

Student Task Statement

1. Escribe debajo de cada marca el número que la marca representa.



2. Estos son 8 números.

   0.10 0.40 0.80 1.10 0.15 0.45

   0.75 1.05

   a. Ubica y marca cada número en la recta numérica.

   b. ¿Cuál es el mayor número? ¿Cuál es el menor? Explica cómo puede ayudar la recta numérica a encontrar el mayor número y el menor número.

3. Ubica y marca estos números en la recta numérica.

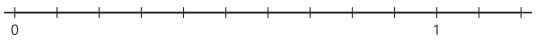
Launch

- Groups of 3–4

Activity

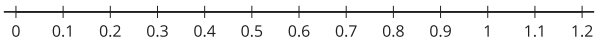
- If creating a giant number line, lead the activity as outlined in the *Activity Narrative*. Otherwise, ask students to work with their group on the first two problems.
- Pause and discuss:
  - How students knew where to put each decimal.
  - How the number line could help us see the least and greatest.
- *"Tómense unos minutos para completar en silencio el resto de la actividad" //* "Take a few quiet minutes to complete the rest of the activity."
- 5–6 minutes: independent work time

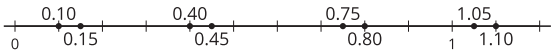
0.24 0.96 0.61 1.12 0.08



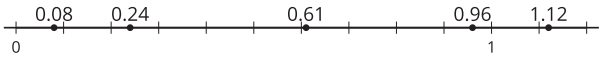
4. En cada caso, usa 2 números de las preguntas anteriores para hacer que la afirmación de comparación sea verdadera.
   a. _____ es mayor que _____.
   b. _____ es menor que _____.
   c. _____ es el mayor número.

Student Response

1. 

2. a. 

   b. Greatest: 1.10, Least: 0.10. Sample response: The least decimal is closest to 0 or is the leftmost one (0.10). The greatest one is the rightmost one (1.10).

3. 

4. Sample response:
   a. 0.80 is greater than 0.75.
   b. 0.61 is less than 0.96.
   c. 1.12 is the greatest number.

Activity Synthesis

- Select students to display their completed number lines (showing the locations of five additional decimals).
- Invite the class to agree or disagree with the locations of the point and discuss any disagreements.
- Select other students to share their comparison statements and how they know each statement is true.

Advancing Student Thinking

If students are unsure whether to label the tick marks between 0 and 1 in terms of tenths or hundredths, or whether to use fraction or decimal notation, consider asking:

- *"¿Qué observas acerca de los números de la actividad?"* // "What do you notice about the numbers in the activity?"
- *"¿Qué números podríamos escribir en las marcas de la recta numérica como ayuda para ubicar los decimales?"* // "What labels could we put on the number line to help us locate the decimals?"

Activity 2

15 min

Comparemos decimales

Standards

Addressing **4.NF.C.7**

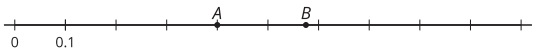
In this activity, students continue to compare decimals to hundredths. They begin by reasoning with a number line and work toward generalizing their observations. Some students may compare two numbers by analyzing the value of the digits in the same place (for example, the tenths in one number and the tenths in the other). Comparing decimals by place value is a standard for grade 5 and is not expected at this point.

Access for English Language Learners

MLR8 Discussion Supports. Display sentence frames to support partner discussion: *"Observé _____, entonces yo . . . "* // "I noticed _____ so I . . ." and *"Estoy de acuerdo / en desacuerdo porque . . ."* // "I agree/disagree because . . . ." *Advances: Conversing, Representing*

Student Task Statement

1. Esta recta numérica tiene 2 puntos marcados.



   a. Escribe el decimal que está en el punto *A*.
   b. ¿El decimal del punto *A* es menor que o mayor que 0.50? Explica o muestra tu razonamiento.
   c. ¿El decimal del punto *B* es mayor que o menor que 0.06? Explica tu razonamiento.
   d. Estima el decimal del punto *B*.

2. Compara los números escribiendo un $>$, un $<$ o un $=$. ¿Se te ocurre alguna forma de comparar sin usar una recta numérica?

   a. $0.51 \_\_\_\_\_ 0.09$
   b. $0.19 \_\_\_\_\_ 0.91$
   c. $0.45 \_\_\_\_\_ 0.54$
   d. $0.62 \_\_\_\_\_ 0.26$
   e. $1.02 \_\_\_\_\_ 0.95$
   f. $0.3 \_\_\_\_\_ 0.30$
   g. $4.01 \_\_\_\_\_ 4.10$

Launch

- Groups of 2

Activity

- *"En silencio, trabajen unos minutos en la actividad. Luego, compartan con su compañero cómo pensaron"* // "Take a few quiet minutes to work on the activity. Then share your thinking with your partner."
- 7–8 minutes: independent work time
- 3–4 minutes: partner discussion
- For the comparisons in the second problem, monitor for students who:
  - Name the decimal in words and compare the number of hundredths (for example, 62 hundredths and 26 hundredths).
  - Relate the decimals to benchmarks such as 0, 0.5, and 1.

Activity Synthesis

- See *Lesson Synthesis.*

Student Response

1. Sample response:
   a. 0.4 or 0.40
   b. Less than 0.50, because it is to the left of 0.5 or 0.50 on the number line (or because 4 tenths is 40 hundredths, which is less than 50 hundredths).
   c. The decimal at point B is greater than 0.06, because 0.06 or 6 hundredths is to its far left on the number line, close to 0.
   d. 0.57 or 0.58
2. a. $>$
   b. $<$
   c. $<$
   d. $>$
   e. $>$
   f. $=$
   g. $<$

Lesson Synthesis

"Hoy comparamos decimales teniendo en cuenta sus décimas y sus centésimas" // "Today we compared decimals in tenths and hundredths."

"¿Cómo podemos usar una recta numérica para ayudarnos a hacer comparaciones?" // "How can we use a number line to help us make comparisons?" (We can plot the decimals on the number line. The one farther to the right is the greater decimal.)

"¿Cómo podríamos comparar decimales sin usar una recta numérica? ¿Qué estrategias usaron para completar las afirmaciones de comparación de la última actividad?" // "How might we compare decimals without using a number line? What strategies did you use when completing the comparison statements in the last activity?"

If not mentioned in students' explanations, highlight the following reasoning strategies:

- Name the decimals in words and compare the number of hundredths. (For example, 51 hundredths is more than 9 hundredths.)
- Compare each decimal to benchmarks like 0, 0.5, 1, or other decimals. (For example, 0.51 is close to 0.50, while 0.09 is close to 0.10 or close to 0.)

Suggested Centers

- Rolling for Fractions (3–5), Stage 1: Equivalent Fractions (Supporting)
- Get Your Numbers in Order (1–5), Stage 4: Denominators 2, 3, 4, 5, 6, 8, 10, 12, 100 (Supporting)

Cool-down

5 min

Sigue comparando

Standards

Addressing **4.NF.C.7**

Student Task Statement

En cada caso, escribe un <, un > o un = para que la afirmación de comparación sea verdadera. Si te ayuda, usa una recta numérica.

1. 1.1 _____ 1.10
2. 0.9 _____ 0.19
3. 0.03 _____ 0.32
4. 5.91 _____ 5.01
5. 4.60 _____ 4.6
6. 3.73 _____ 3.83

Student Response

1. =
2. >
3. <
4. >
5. =
6. <

Responding to Student Thinking

Students may disregard the decimal points in each pair of numbers and compare the numbers as if they were whole numbers.

Next Day Supports
Launch the *Warm-up* or the first activity by highlighting important notation from previous lessons.