

# LESSON 7

## Objective

Distinguish absolute value from order.

## Common Core State Standards

- **6.NS.7c** Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write  $|-30| = 30$  to describe the size of the debt in dollars.*
- **6.NS.7d** Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.*

## The Number System

# Absolute Value

Students must understand absolute value before learning how to add and subtract integers. Using concrete models will help students learn that opposite integers on a number line have the same absolute value and that comparisons of absolute value differ from statements about order. This learning will help students apply integers to real-world situations.

**Try It!** Perform the Try It! activity on the next page.

## Talk About It

Discuss the Try It! activity.

- Write –15 and +6 on the board. **Ask:** *Where are these values on a number line? Which value is greater?*
- Write  $|-15|$  and  $|+6|$  on the board. **Ask:** *Which absolute value is greater?*
- Discuss the difference between absolute value (distance from 0) and order (position on a number line).
- Write –60 on the board. **Say:** *Think of a scenario that demonstrates the meaning of –60.* Discuss scenarios (e.g., 60 feet below sea level). Distinguish between magnitude (absolute value) and position.

## Solve It

Reread the problem with students. Have students write  $|-10| = 10$ ,  $|+5| = 5$ , and the inequality sentence that compares the amounts ( $10 > 5$ ). Have students write why –10 is a greater change than +5 even though –10 is less than +5 on the number line.

## More Ideas

For other ways to teach about distinguishing absolute value from order—

- Use Cuisenaire® Rods. Have students work in pairs and each choose a rod. Let one rod be a negative value and the other be a positive value. Have students give scenarios that demonstrate their integers in action. Then have them compare the lengths of their rods.
- Repeat the above activity, but make both values negative or both values positive.

## Formative Assessment

Have students try the following problem.

*Which of the following represents a debt greater than \$50?*

- A. –\$25    B. \$75    C. \$15    D. –\$75

## Try It! 15 minutes | Pairs

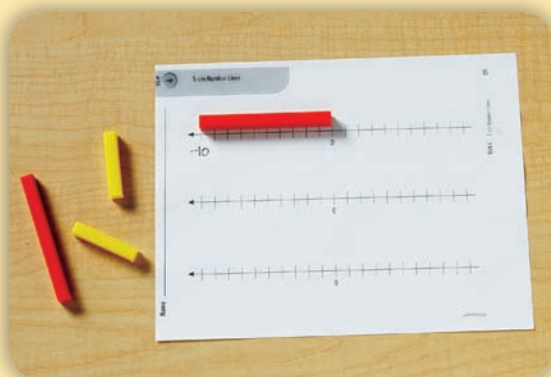
Here is a problem about distinguishing absolute value from order.

*Jamie and Devon both have savings accounts. Within one week's time, Jamie's account balance had a change of  $-\$10$  and Devon's had a change of  $+\$5$ . Who experienced the greater change in account balance?*

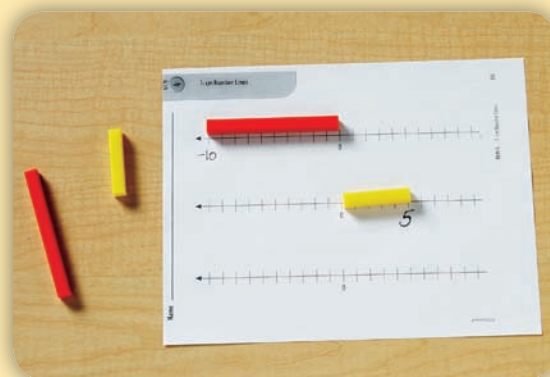
Introduce the problem. Then have students do the activity to solve the problem. Distribute Cuisenaire Rods and 1-cm Number Lines (BLM 5) to students.

### Materials

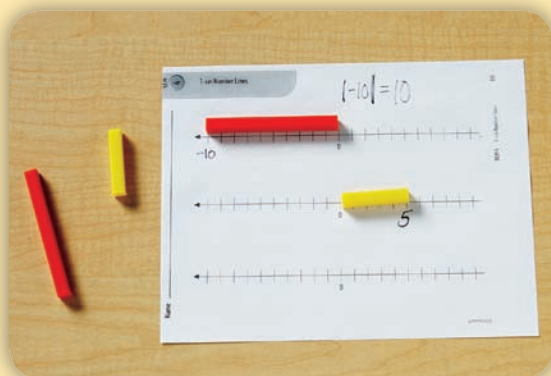
- Cuisenaire® Rods
- 1-cm Number Lines (BLM 5; 1 per pair)
- pencils (1 per pair)



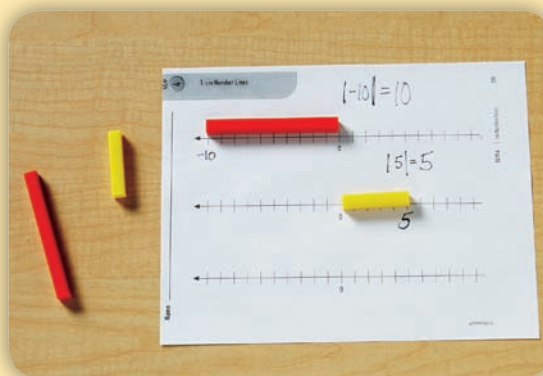
**1. Say:** You are going to model the amount of change in both account balances. Assuming that the white Cuisenaire Rod represents 1, find a rod that represents 10. If necessary, help students determine that the orange rods represent 10. **Say:** Find  $-10$  on the number line. Label it. Using the rod, cover the interval that stretches from  $-10$  to 0.



**2. Say:** Find a rod that represents 5. If necessary, help students determine that the yellow rods represent 5. **Say:** Find  $+5$  on the number line. Label it. Using the rod, cover the interval that stretches from 0 to  $+5$ .



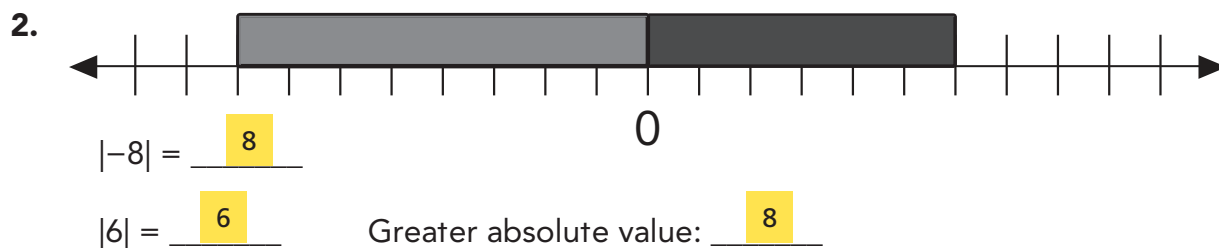
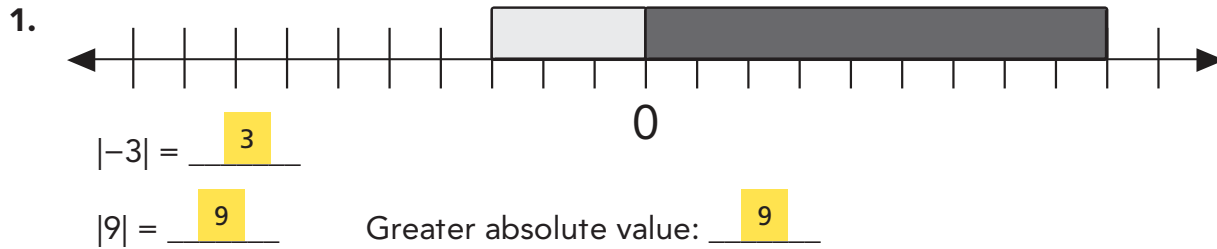
**3. Ask:** What is the length of the interval from  $-10$  to 0? Elicit that the length, as indicated by the orange rod, is 10. Explain that the rod demonstrates how far  $-10$  is from 0. Tell students that the distance a number is from 0 is called the absolute value of the number. Note that the symbol for absolute value is  $|$ . Have students write  $|-10| = 10$  above the orange rod.



**4. Ask:** What is the length of the interval from 0 to  $+5$ ? What is the absolute value of  $+5$ ? Write  $|+5| = 5$  above the yellow rod. **Ask:** Which absolute value is greater? Which account balance experienced the greater change? Elicit that the decrease in Jamie's account is greater than the increase in Devon's account.

Use Cuisenaire Rods and a number line. Model the numbers. Write the absolute values. Find the greater absolute value.

(Check students' work.)



Write a situation that each integer could represent.

3. +17 Possible answer: climb 17 feet up a ladder

4. -61 Possible answer: owe \$61

5. -9 Possible answer: temperature 9 degrees below zero

6. +12 Possible answer: earn \$12 babysitting

Write the absolute value.

7.  $|-40| = \underline{40}$

8.  $|33| = \underline{33}$

9.  $|16| = \underline{16}$

10.  $|-11| = \underline{11}$

11.  $|-90| = \underline{90}$

12.  $|4| = \underline{4}$

## Answer Key

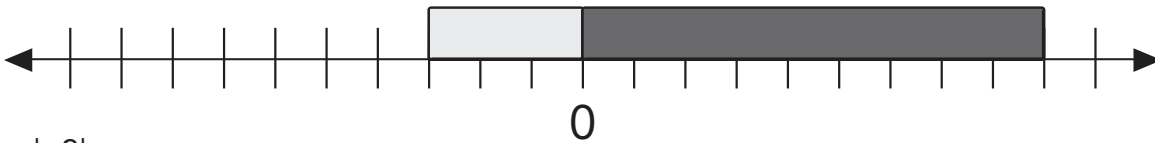
**Challenge!** Consider point A on a number line. A represents a negative number. How would the absolute value of A change if it is moved 4 units to the left? Explain.

Challenge: The absolute value of  $A$  would increase by 4. A negative number that moves 4 units to the left moves farther from 0; therefore, it would increase by 4.

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Use Cuisenaire Rods and a number line. Model the numbers.  
Write the absolute values. Find the greater absolute value.

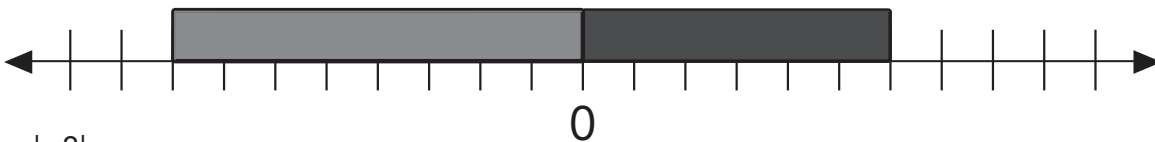
1.



$$|-3| = \underline{\hspace{2cm}}$$

$$|9| = \underline{\hspace{2cm}} \quad \text{Greater absolute value: } \underline{\hspace{2cm}}$$

2.



$$|-8| = \underline{\hspace{2cm}}$$

$$|6| = \underline{\hspace{2cm}} \quad \text{Greater absolute value: } \underline{\hspace{2cm}}$$

Write a situation that each integer could represent.

3.  $+17$  \_\_\_\_\_

\_\_\_\_\_

4.  $-61$  \_\_\_\_\_

\_\_\_\_\_

5.  $-9$  \_\_\_\_\_

\_\_\_\_\_

6.  $+12$  \_\_\_\_\_

\_\_\_\_\_

Write the absolute value.

7.  $|-40| = \underline{\hspace{2cm}}$

8.  $|33| = \underline{\hspace{2cm}}$

9.  $|16| = \underline{\hspace{2cm}}$

10.  $|-11| = \underline{\hspace{2cm}}$

11.  $|-90| = \underline{\hspace{2cm}}$

12.  $|4| = \underline{\hspace{2cm}}$

Name \_\_\_\_\_

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Name \_\_\_\_\_

