Rational Numbers and Coordinates

Lesson 8 Magnitude and Order

Standards 6.NS.C.7c, 6.NS.C.7d

Learning target I can distinguish a number from its distance to zero.

Materials Number lines, coordinate grids, rulers, colored pencils.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about magnitude and order. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. The absolute value |x| is the distance from x to zero, so it cannot be negative. A larger absolute value means farther from zero, but does not necessarily mean a greater number. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: A diver is at -28 m and a bird is at 4 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values. Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch order versus absolute value, coordinate order, and which sign changes in a reflection.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

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Learn and Discuss

The absolute value |x| is the distance from x to zero, so it cannot be negative. A larger absolute value means farther from zero, but does not necessarily mean a greater number.

Example 1 Find |-16|. Explain the distance meaning.
Solution 16. -16 is 16 units from 0; distance is nonnegative.
Example 2 A diver is at -21 m and a bird is at 7/2 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.
Solution Diver: 21 m from sea level; bird has greater elevation. |-21| = 21 > |7/2| = 7/2, but -21 < 7/2.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

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Name _____ Show calculations, models, and units.

1. Find |-12|. Explain the distance meaning.

2. Find |-8|. Explain the distance meaning.

3. Find |-21|. Explain the distance meaning.

4. Find |-8| and compare it with |2|.

5. Find |-14| and compare it with |2|.

6. Find |-12| and compare it with |4|.

7. A diver is at -12 m and a bird is at 4 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

8. A diver is at -5 m and a bird is at 1 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

9. A diver is at -7 m and a bird is at 7/2 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

10. A diver is at -28 m and a bird is at 4 m relative to sea level. Who is farther from sea level? Who has greater elevation? Use absolute values.

Magnitude and Order

Rational Numbers and Coordinates

1. 12
Reasoning -12 is 12 units from 0; distance is nonnegative.

2. 8
Reasoning -8 is 8 units from 0; distance is nonnegative.

3. 21
Reasoning -21 is 21 units from 0; distance is nonnegative.

4. 8; 8 > 2
Reasoning -8 is 8 units from 0; distance is nonnegative.

5. 14; 14 > 2
Reasoning -14 is 14 units from 0; distance is nonnegative.

6. 12; 12 > 4
Reasoning -12 is 12 units from 0; distance is nonnegative.

7. Diver: 12 m from sea level; bird has greater elevation
Reasoning |-12| = 12 > |4| = 4, but -12 < 4.

8. Diver: 5 m from sea level; bird has greater elevation
Reasoning |-5| = 5 > |1| = 1, but -5 < 1.

9. Diver: 7 m from sea level; bird has greater elevation
Reasoning |-7| = 7 > |7/2| = 7/2, but -7 < 7/2.

10. Diver: 28 m from sea level; bird has greater elevation
Reasoning |-28| = 28 > |4| = 4, but -28 < 4.