Rational Numbers and Coordinates

Lesson 12 Distances Across the Axes

Standards 6.NS.C.8

Learning target I can graph points and find horizontal or vertical distance.

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 distances across the axes. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. Plot both points. If x-coordinates match, count the vertical units; if y-coordinates match, count horizontal units. On opposite sides of zero, add distances to zero. On the same side, subtract magnitudes. 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: Plot (-3, 2) and (3, 2). Find their distance. Explain why adding magnitudes works or does not work for these points. 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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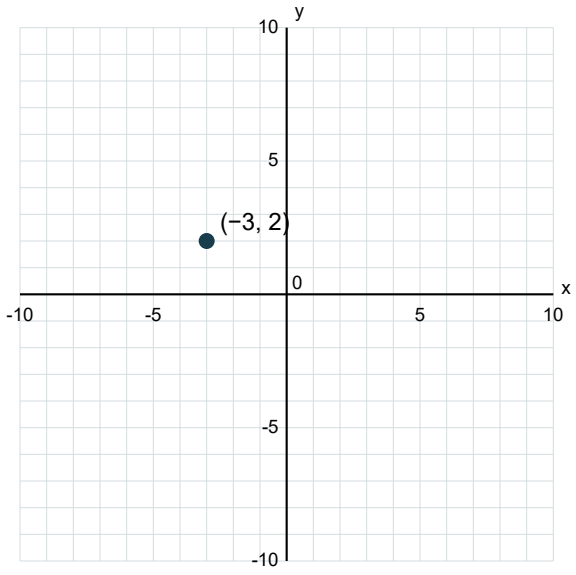
Learn and Discuss

Plot both points. If x-coordinates match, count the vertical units; if y-coordinates match, count horizontal units. On opposite sides of zero, add distances to zero. On the same side, subtract magnitudes.

Example 1 Plot (-8, 5) and (-13, 5). Find their distance.
Solution 5 units. Only one coordinate changes. Same side of 0: subtract magnitudes to get 5.
Example 2 Plot (-8, 4) and (7, 4). Find their distance. Explain why adding magnitudes works or does not work for these points.
Solution 15 units. Only one coordinate changes. Opposite sides of 0: 8 + 7 = 15.

Classwork Show Your Work

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



Model a point (−3, 2) means move 3 left and 2 up from the origin. Label the axes and scale before plotting.

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Name _____ Show calculations, models, and units.

1. Plot (4, -4) and (4, -8). Find their distance.

2. Plot (-6, 4) and (-10, 4). Find their distance.

3. Plot (6, -4) and (6, -10). Find their distance.

4. Plot (-8, 6) and (3, 6). Find their distance.

5. Plot (3, -2) and (3, 2). Find their distance.

6. Plot (-3, 2) and (3, 2). Find their distance.

7. Plot (6, -5) and (6, 6). Find their distance. Explain why adding magnitudes works or does not work for these points.

8. Plot (-8, 5) and (2, 5). Find their distance. Explain why adding magnitudes works or does not work for these points.

9. Plot (2, -8) and (2, 5). Find their distance. Explain why adding magnitudes works or does not work for these points.

10. Plot (-3, 2) and (3, 2). Find their distance. Explain why adding magnitudes works or does not work for these points.

Distances Across the Axes

Rational Numbers and Coordinates

1. 4 units
Reasoning Only one coordinate changes. Same side of 0: subtract magnitudes to get 4.

2. 4 units
Reasoning Only one coordinate changes. Same side of 0: subtract magnitudes to get 4.

3. 6 units
Reasoning Only one coordinate changes. Same side of 0: subtract magnitudes to get 6.

4. 11 units
Reasoning Only one coordinate changes. Opposite sides of 0: 8 + 3 = 11.

5. 4 units
Reasoning Only one coordinate changes. Opposite sides of 0: 2 + 2 = 4.

6. 6 units
Reasoning Only one coordinate changes. Opposite sides of 0: 3 + 3 = 6.

7. 11 units
Reasoning Only one coordinate changes. Opposite sides of 0: 5 + 6 = 11.

8. 10 units
Reasoning Only one coordinate changes. Opposite sides of 0: 8 + 2 = 10.

9. 13 units
Reasoning Only one coordinate changes. Opposite sides of 0: 8 + 5 = 13.

10. 6 units
Reasoning Only one coordinate changes. Opposite sides of 0: 3 + 3 = 6.