Equations Inequalities and Relationships

Lesson 8 Testing Inequality Solutions

Standards 6.EE.B.5, 6.EE.B.8

Learning target I can test values and explain the many solutions of an inequality.

Materials Balance models, number lines, coordinate grids, rulers.

Lesson Flow 50 Minutes

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

5–17 Teach and model. Substitute each value and decide whether the comparison is true. A continuous number-line ray represents infinitely many real-number solutions. A real situation may restrict useful solutions to whole numbers. 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: Which values in {14, 15, 16} satisfy $x \leq 15$? Does the real-number inequality have only these solutions? Explain. 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 inverse operations, equality on both sides, open versus closed endpoints, and input/output order.

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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Learning target I can test values and explain the many solutions of an inequality.

Learn and Discuss

Substitute each value and decide whether the comparison is true. A continuous number-line ray represents infinitely many real-number solutions. A real situation may restrict useful solutions to whole numbers.

Example 1 Which values in {8, 9, 10} satisfy $x \le 9$? Test each by substitution.
Solution 8, 9. Values below 9 work; the endpoint works too.
Example 2 Which values in {10, 11, 12} satisfy $x \le 11$? Does the real-number inequality have only these solutions? Explain.
Solution 10, 11; no, infinitely many real values satisfy it. Values below 11 work; the endpoint works too.

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. Which values in {10, 11, 12} satisfy x < 11? Test each by substitution.

2. Which values in {5, 6, 7} satisfy x ≤ 6? Test each by substitution.

3. Which values in {8, 9, 10} satisfy x < 9? Test each by substitution.

4. Which values in {3, 4, 5} satisfy x ≤ 4? Test each by substitution.

5. Which values in {9, 10, 11} satisfy x < 10? Test each by substitution.

6. Which values in {14, 15, 16} satisfy x ≤ 15? Test each by substitution.

7. Which values in {7, 8, 9} satisfy x < 8? Does the real-number inequality have only these solutions? Explain.

8. Which values in {5, 6, 7} satisfy x ≤ 6? Does the real-number inequality have only these solutions? Explain.

9. Which values in {9, 10, 11} satisfy x < 10? Does the real-number inequality have only these solutions? Explain.

10. Which values in {14, 15, 16} satisfy x ≤ 15? Does the real-number inequality have only these solutions? Explain.

Testing Inequality Solutions

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1. 10
Reasoning Values below 11 work; the endpoint does not work.

2. 5, 6
Reasoning Values below 6 work; the endpoint works too.

3. 8
Reasoning Values below 9 work; the endpoint does not work.

4. 3, 4
Reasoning Values below 4 work; the endpoint works too.

5. 9
Reasoning Values below 10 work; the endpoint does not work.

6. 14, 15
Reasoning Values below 15 work; the endpoint works too.

7. 7; no, infinitely many real values satisfy it
Reasoning Values below 8 work; the endpoint does not work.

8. 5, 6; no, infinitely many real values satisfy it
Reasoning Values below 6 work; the endpoint works too.

9. 9; no, infinitely many real values satisfy it
Reasoning Values below 10 work; the endpoint does not work.

10. 14, 15; no, infinitely many real values satisfy it
Reasoning Values below 15 work; the endpoint works too.