Writing Inequalities

Writing inequalities: Mistakes and missing information

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

Decide which side is allowed: larger values use $>$, smaller values use $<$. Then test the boundary. Include equality for at least ($\geq$) and at most ($\leq$). For example, a temperature at most -1 includes -1 and smaller numbers such as -2. State the variable and units.

Worked example

Let x be age in whole years. Write at least 13 years. Test the boundary and nearby ages.

1. The rule admits ages above 13 and excludes younger ages, so choose the greater-than direction.
2. Test the boundary: $x = 13$ is included, so use $\geq$.
3. $14 \geq 13$ is true, while $12 \geq 13$ is false; the allowed side is right.
Answer: $x \geq 13$.

Practice Problems

Show your thinking.

1. A student writes $x > 7$ for at least 7. Correct and test 7.

2. A student writes $x \leq 9$ for less than 9. Correct and test 9.

3. A boundary value 4 is allowed, but larger values are not. Recover the inequality.

4. A student writes $x < -3$ for warmer than -3 degrees. Correct it.

5. The smallest allowed value is 12, and every larger value is allowed. Recover the rule.

6. Explain the difference between at most 5 and less than 5 by writing the first and testing 5.

7. A student writes $x < 10$ for no more than 10. Correct it and test the boundary.

8. The minimum allowed temperature is -4 degrees, and all warmer values are allowed. Recover the rule using x.

Answer Key

1. $x \geq 7$.
2. $x < 9$.
3. $x \leq 4$.
4. $x > -3$.
5. $x \geq 12$.
6. At most: $x \leq 5$ accepts 5. Less than: $x < 5$ rejects 5.
7. $x \leq 10$.
8. $x \geq -4$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The stated condition allows larger values than 7 on the number line.
2. Test the boundary: $x = 7$ is included, so use $\geq$.
3. $8 \geq 7$ is true, while $6 \geq 7$ is false; the allowed side is right.

Problem 2

1. The stated condition allows smaller values than 9 on the number line.
2. Test the boundary: $x = 9$ is excluded, so use $<$.
3. $8 < 9$ is true, while $10 < 9$ is false; the allowed side is left.

Problem 3

1. The stated condition allows smaller values than 4 on the number line.
2. Test the boundary: $x = 4$ is included, so use $\leq$.
3. $3 \leq 4$ is true, while $5 \leq 4$ is false; the allowed side is left.

Problem 4

1. The stated condition allows larger values than -3 on the number line.
2. Test the boundary: $x = -3$ is excluded, so use $>$.
3. $-2 > -3$ is true, while $-4 > -3$ is false; the allowed side is right.

Problem 5

1. The stated condition allows larger values than 12 on the number line.
2. Test the boundary: $x = 12$ is included, so use $\geq$.
3. $13 \geq 12$ is true, while $11 \geq 12$ is false; the allowed side is right.

Problem 6

1. The stated condition allows smaller values than 5 on the number line.
2. Test the boundary: $x = 5$ is included, so use $\leq$.
3. $4 \leq 5$ is true, while $6 \leq 5$ is false; the allowed side is left.
4. At $x = 5$, $5 \leq 5$ is true, but $5 < 5$ is false. Equality is the only difference at the boundary.

Problem 7

1. The stated condition allows smaller values than 10 on the number line.
2. Test the boundary: $x = 10$ is included, so use $\leq$.
3. $9 \leq 10$ is true, while $11 \leq 10$ is false; the allowed side is left.

Problem 8

1. The stated condition allows larger values than -4 on the number line.
2. Test the boundary: $x = -4$ is included, so use $\geq$.
3. $-3 \geq -4$ is true, while $-5 \geq -4$ is false; the allowed side is right.

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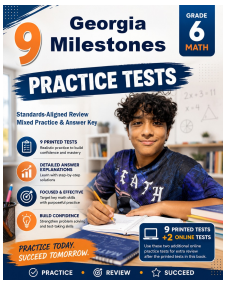

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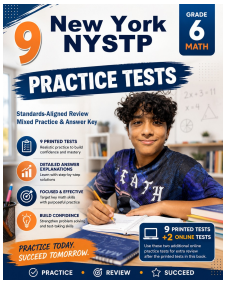

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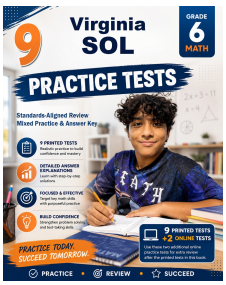

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