Graphing Inequalities on a Number Line

Graphing inequalities on number lines: Mistakes and missing information

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

An open circle excludes the boundary; a filled circle includes it. Shade left for $<$ or $\leq$, right for $>$ or $\geq$. A real measurement can also have a lower bound. For example, $0 < x \leq 3$ excludes 0 but includes 3.

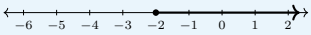
Worked example

Graph $x \geq -2$ and test one value on each side.

1. Test the boundary: $x = -2$ is included, so use $\geq$.

2. $-1 \geq -2$ is true, while $-3 \geq -2$ is false; the allowed side is right.

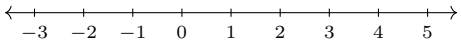
Answer: $x \geq -2$. Closed circle at -2; shade right.



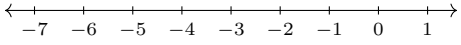
Practice Problems

Show your thinking.

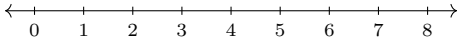
1. A student uses an open circle for $x \geq 1$. Draw the corrected graph.



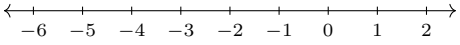
2. A student shades right for $x < -3$. Draw the correct graph.



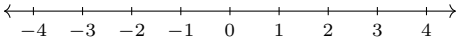
3. A graph has a closed boundary at 4 and extends left. Reconstruct it and write its inequality.



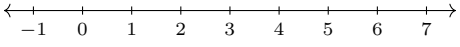
4. A graph has an open boundary at -2 and extends right. Reconstruct and write its rule.



5. A student closes the circle for $x < 0$. Graph $x \leq 0$ instead and explain the changed boundary.



6. A student draws $x > 3$ with a closed boundary at 3. Repair it.



Answer Key

1. $x \geq 1$. Closed circle at 1; shade right.
2. $x < -3$. Open circle at -3; shade left.
3. $x \leq 4$. Closed circle at 4; shade left.
4. $x > -2$. Open circle at -2; shade right.
5. $x \leq 0$. Closed circle at 0; shade left.
6. $x > 3$. Open circle at 3; shade right.

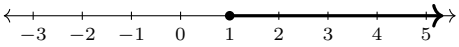
Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Test the boundary: $x = 1$ is included, so use $\geq$.

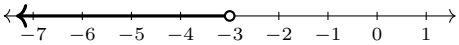
2. $2 \geq 1$ is true, while $0 \geq 1$ is false; the allowed side is right.



Problem 2

1. Test the boundary: $x = -3$ is excluded, so use $<$.

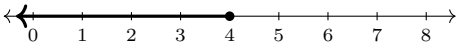
2. $-4 < -3$ is true, while $-2 < -3$ is false; the allowed side is left.



Problem 3

1. Test the boundary: $x = 4$ is included, so use $\leq$.

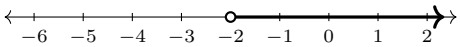
2. $3 \leq 4$ is true, while $5 \leq 4$ is false; the allowed side is left.



Problem 4

1. Test the boundary: $x = -2$ is excluded, so use $>$.

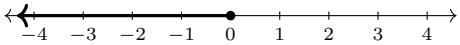
2. $-1 > -2$ is true, while $-3 > -2$ is false; the allowed side is right.



Problem 5

1. Test the boundary: $x = 0$ is included, so use $\leq$.

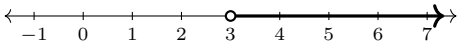
2. $-1 \leq 0$ is true, while $1 \leq 0$ is false; the allowed side is left.



Problem 6

1. Test the boundary: $x = 3$ is excluded, so use $>$.

2. $4 > 3$ is true, while $2 > 3$ is false; the allowed side is right.



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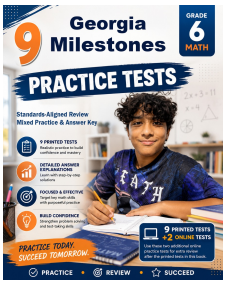

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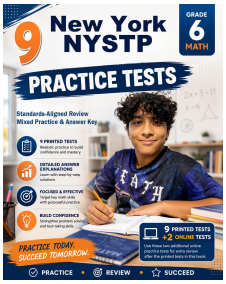

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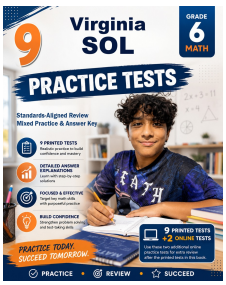

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