Graphing Inequalities on a Number Line

Graphing inequalities on number lines: Applications and decisions

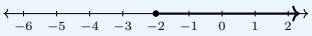
Name _____ **Date** _____ **Score** _____ / 6

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 $\geq$.

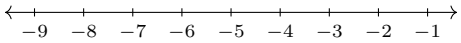
2. $-1 \geq -2$ is true, while $-3 \geq -2$ is false; the allowed side is right.

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

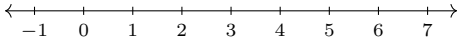
Practice Problems

Show your thinking.

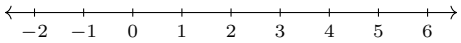
1. A freezer must be no colder than $-5°$C. Graph the allowed temperatures.



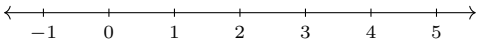
2. A machine needs a part with positive length x less than 6 cm. Graph all allowed lengths.



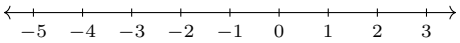
3. Design a graph for water depths at least 2 m, using x for depth.



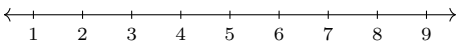
4. A scale accepts any load x from 0 to 4 kg, including both endpoints. Graph its range.



5. Temperatures must be warmer than $-1°$C. Reconstruct the correct graph.



6. An account balance may be negative, but it must be at most 5 dollars. A graph uses an open circle at 5. Correct the graph.



Answer Key

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

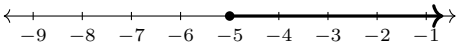
Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Test the boundary: $x = -5$ is included, so use $\geq$.

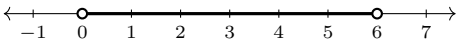
2. $-4 \geq -5$ is true, while $-6 \geq -5$ is false; the allowed side is right.



Problem 2

1. The length must be positive, so use an open dot at 0.

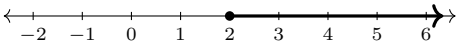
2. Put an open dot at 6; the limit is not allowed. Shade only between the dots.



Problem 3

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

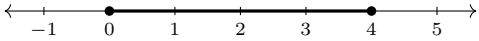
2. $3 \geq 2$ is true, while $1 \geq 2$ is false; the allowed side is right.



Problem 4

1. Use a filled dot at 0 because an empty load is allowed.

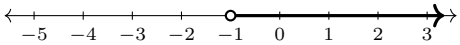
2. Put a filled dot at 4; the limit is allowed. Shade only between the dots.



Problem 5

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

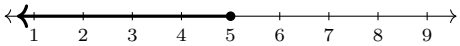
2. $0 > -1$ is true, while $-2 > -1$ is false; the allowed side is right.



Problem 6

1. Test the boundary: $x = 5$ is included, so use $\leq$.

2. $4 \leq 5$ is true, while $6 \leq 5$ is false; the allowed side is left.



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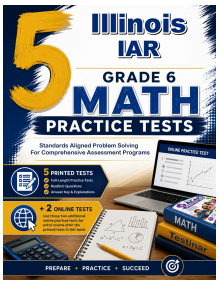

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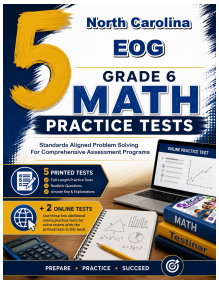

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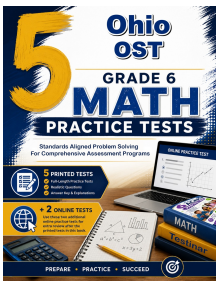

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