LESSON MAKER PRO

Beyond the Boundary

Graph inequalities and explore their solutions.

GRADE 6 · 6.AF.B.20.b

6.AF.B.20.b "Represent the solutions of inequalities on a number line and explain that the solution set may contain infinitely many solutions."

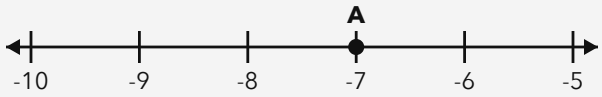
NAME _____ DATE _____

GRAPHING A SOLUTION SET

A boundary point separates solutions from numbers that do not work. Use an open circle when the boundary is not included and a closed circle when it is. Shade left for lesser values or right for greater values. Each shaded ray contains infinitely many numbers.

WORKED EXAMPLE

Point A marks the boundary. Show all numbers greater than A on the number line, then write an inequality.

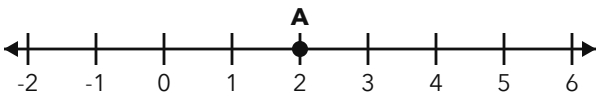


1. Read the boundary: A is at -7.
2. Draw an open circle at -7 because greater than does not include -7.
3. Shade to the right because greater numbers are to the right.
4. Write x > -7.

Answer: Open circle at -7, shaded right; x > -7.

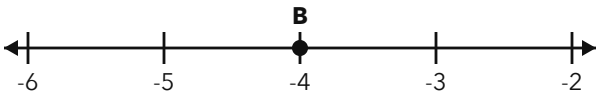
PRACTICE 6 problems

1 Point A marks the boundary. Draw the solutions to x ≤ A on the number line.



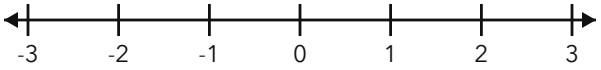
ANSWER _____

2 Point B marks the boundary. Write an inequality for all numbers greater than B.



ANSWER _____

3 Graph $x < 0$. Name two different solutions.



ANSWER _____

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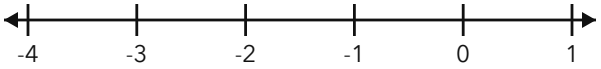
4 Graph $x \geq 5$. Is 5 a solution? Explain.



ANSWER _____

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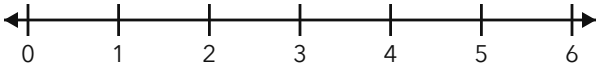
5 Graph $x > -2$. Name one solution between -2 and -1.



ANSWER _____

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6 Graph $x \leq 3$. Explain why the graph has infinitely many solutions.

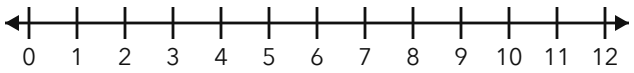


ANSWER _____

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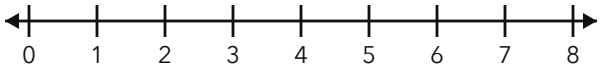
APPLY IT Show your work

1 You have saved $18 for a game that costs at least $25. Let x be the additional money, in dollars, that you save. Write and solve an inequality showing when you will have enough money. Graph the solutions.



ANSWER _____

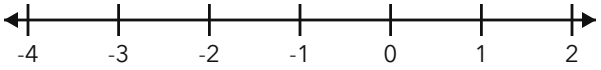
2 You have listened to 6 minutes of a podcast. You earn a listening badge after more than 10 minutes. Let x be the additional time you listen, in minutes. Write and solve an inequality showing when you earn the badge. Graph the solutions.



ANSWER _____

CHALLENGE One step up

Solve $x + 3/2 \leq 1/2$ and graph the solutions. Explain why infinitely many solutions lie strictly between -2 and -1, even though the number line marks only whole numbers.



WORK SPACE AND ANSWER

ANSWER KEY

Beyond the Boundary

GRADE 6 · 6.AF.B.20.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Point A marks the boundary. Draw the solutions to $x \leq A$ on the number line.	**Closed circle at 2, shaded left.**
2	Point B marks the boundary. Write an inequality for all numbers greater than B.	**$x > -4$**
3	Graph $x < 0$. Name two different solutions.	**Open circle at 0, shaded left; for example, -1 and -1/2.**
4	Graph $x \geq 5$. Is 5 a solution? Explain.	**Closed circle at 5, shaded right. Yes, the ≥ sign includes 5.**
5	Graph $x > -2$. Name one solution between -2 and -1.	**Open circle at -2, shaded right; for example, -3/2.**
6	Graph $x \leq 3$. Explain why the graph has infinitely many solutions.	**Closed circle at 3, shaded left. There are infinitely many numbers less than 3, including fractions between the tick marks.**

PART 2 · APPLY IT

1. **$18 + x \geq 25$; $x \geq 7$. Closed circle at 7, shaded right.** Subtract 18 from both sides of $18 + x \geq 25$. Saving $7 or more gives you at least $25.
2. **$6 + x > 10$; $x > 4$. Open circle at 4, shaded right.** Subtract 6 from both sides of $6 + x > 10$. Exactly 4 more minutes is not enough because the total must be more than 10 minutes.

CHALLENGE

$x \leq -1$. Draw a closed circle at -1 and shade left. Every number strictly between -2 and -1 is less than -1, and infinitely many fractions and decimals lie in that interval.

Accept any correctly placed open or closed circle with shading in the correct direction. Accept any valid examples of solutions, including fractions and decimals between tick marks.