LESSON MAKER PRO

Where's the Limit?

Write inequalities and show their solutions.

GRADE 6 · 6.AF.B.20

6.AF.B.20 "Write and solve inequalities in the form of x>c, x<c, x≥ c, or x ≤ c to represent a constraint or condition in a real-world or mathematical problem. a. Interpret the solution of an inequality in the context of a problem. b..."

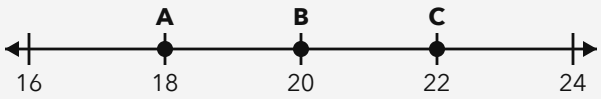
NAME _____ DATE _____

THE BIG IDEA

Use < or > when the boundary is not included. Use ≤ or ≥ when it is included. On a number line, use an open circle for a boundary that is not included or a closed circle for one that is, then shade toward all the solutions. A shaded ray can represent infinitely many numbers.

WORKED EXAMPLE

A sensor flags temperatures greater than the temperature at B. Let x be the temperature. Which labeled temperatures are flagged? Write an inequality for all flagged temperatures and explain how to show its solutions on the number line.



1. Point B marks 20.
2. Greater than excludes 20, so write x > 20.
3. Of the labeled temperatures, only C is greater than 20.
4. To show all solutions, put an open circle at 20 and shade right.

Answer: x > 20; C is flagged. An open circle at 20 with shading to the right shows all solutions.

PRACTICE 6 problems

1 A video clip must be shorter than 7 minutes. Let x be its length in minutes. Write an inequality.

ANSWER _____

2 You can enter a game level if your score is at least 12 points. Let x be your score. Write an inequality.

ANSWER _____

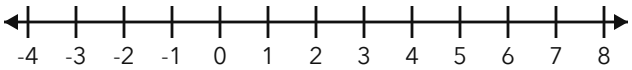
3 On the number line, show all solutions to $x \leq 5$ with a circle and shading. Is 5 a solution?



ANSWER _____

_____

4 On the number line, show all solutions to $x > 3$ with a circle and shading. Is 3 a solution?



ANSWER _____

_____

5 A package can weigh no more than 4 kilograms. Let x be its weight in kilograms. Write an inequality. Is a weight of 4 kilograms allowed?

ANSWER _____

_____

6 Write an inequality for all numbers smaller than -2. Is -2 a solution?

ANSWER _____

_____

APPLY IT Show your work

1 A makerspace cutter accepts designs with a width of at most 13 cm. Let x be a design's width in centimeters. Write an inequality. Would widths of 13 cm and 13.5 cm be accepted? Are there infinitely many possible widths that would be accepted? Explain.

WORK SPACE

ANSWER _____

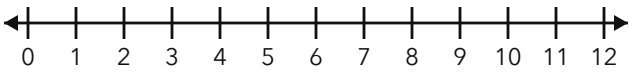
2 To join an online tournament, your download speed must be above 8 megabits per second. Let x be the speed. Write an inequality. Do speeds of 8 and 8.1 qualify? Explain how to show all solutions on a number line.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A music app accepts tracks longer than 3 minutes but shorter than 10 minutes. Let x be a track's length in minutes. On the number line, show the lengths that work. Write two inequalities, explain why one inequality cannot describe all the accepted lengths, and state whether infinitely many lengths work.



WORK SPACE AND ANSWER

ANSWER KEY

Where's the Limit?

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A video clip must be shorter than 7 minutes. Let x be its length in minutes. Write an inequality.	**x < 7**
2	You can enter a game level if your score is at least 12 points. Let x be your score. Write an inequality.	**x ≥ 12**
3	On the number line, show all solutions to x ≤ 5 with a circle and shading. Is 5 a solution?	**Put a closed circle at 5 and shade left. Yes, 5 is a solution.**
4	On the number line, show all solutions to x > 3 with a circle and shading. Is 3 a solution?	**Put an open circle at 3 and shade right. No, 3 is not a solution.**
5	A package can weigh no more than 4 kilograms. Let x be its weight in kilograms. Write an inequality. Is a weight of 4 kilograms allowed?	**x ≤ 4; yes, 4 kilograms is allowed.**
6	Write an inequality for all numbers smaller than -2. Is -2 a solution?	**x < -2; no, -2 is not a solution.**

PART 2 · APPLY IT

1. **x ≤ 13; 13 cm is accepted, but 13.5 cm is not. Infinitely many widths between 0 and 13 cm are accepted.** At most includes the limit of 13 cm. Widths can vary by fractions of a centimeter, so there are infinitely many possible widths below that limit.
2. **x > 8; 8 does not qualify, but 8.1 does. Put an open circle at 8 and shade right.** Above means greater than, so the limit is excluded. Speeds to the right of 8 on the number line qualify.

CHALLENGE

x > 3 and x < 10. Put open circles at 3 and 10, then shade between them. One inequality cannot exclude lengths at both ends. Infinitely many lengths between 3 and 10 minutes work.

Accept a clearly marked open or closed endpoint and correct shading on each number line. For real-world measurements, accept explanations that use fractional or decimal values to show why infinitely many solutions are possible.