LESSON MAKER PRO

Shade the Solutions

Solve inequalities and show what the answers mean.

HIGH SCHOOL · A1.A.2.2

A1.A.2.2 "Represent relationships using mathematical models with compound and absolute value inequalities and solve the resulting inequalities by graphing and interpreting the solutions on a number line."

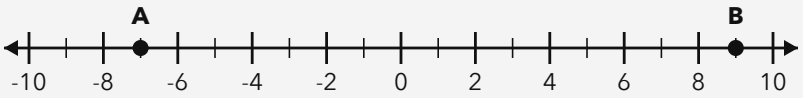
NAME _____ DATE _____

FROM INEQUALITY TO GRAPH

An absolute value inequality describes distance from a center. A less-than inequality keeps values between its boundaries, while a greater-than inequality keeps values outside them. On a number line, use open circles for < or > and closed circles for <= or >=.

WORKED EXAMPLE

Solve |x - 1| < 8. Which marked points are the endpoints of the solution, and how should you shade the number line?

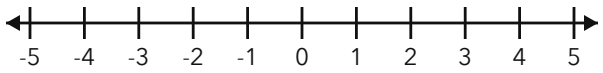


1. Rewrite the distance inequality: -8 < x - 1 < 8.
2. Add 1 to all three parts: -7 < x < 9.
3. Put open circles at A and B. Shade between them.

Answer: -7 < x < 9; A and B are open endpoints, with the segment between them shaded.

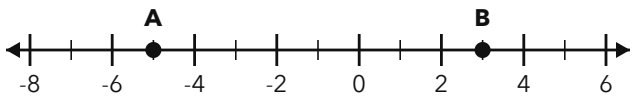
PRACTICE 6 problems

1 Solve -2 <= 3x + 4 < 13. Graph the solution on the number line.



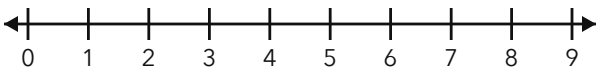
ANSWER _____

2 Write a compound inequality for all values from A to B, including A but not B. Graph the solution on the number line.



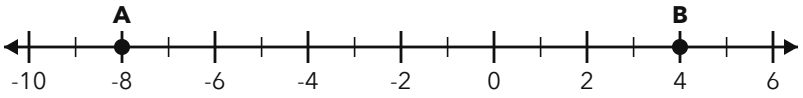
ANSWER _____

3 Solve |x - 4| <= 2. Graph the solution on the number line.



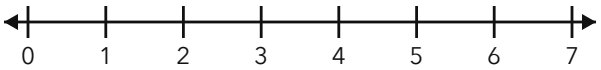
ANSWER _____

4 A and B are the cutoffs. Write an absolute value inequality for values at A or B or outside them. Graph the solution on the number line.



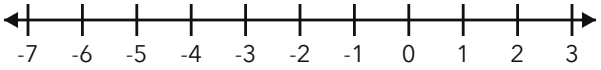
ANSWER _____

5 Solve 5x - 10 > 0 and x + 1 <= 6. Graph the solution on the number line.



ANSWER _____

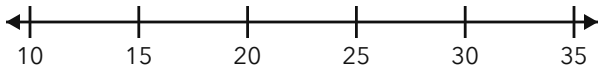
6 Solve |2x + 4| < 6. Graph the solution on the number line.



ANSWER _____

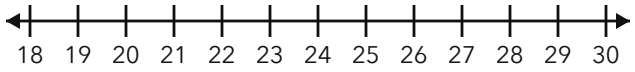
APPLY IT Show your work

1 You plan to spend at least $20 but no more than $35 on a concert shirt and $5 shipping. Let x be the shirt price in dollars. Write and solve a compound inequality. Graph the possible shirt prices and state what your solution means.



ANSWER _____

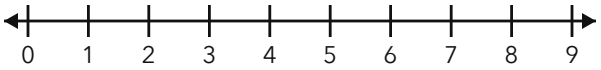
2 Your training plan calls for a run within 3 minutes of a 24-minute target, including the limits. Let x be your run time in minutes. Write and solve an absolute value inequality. Graph the allowed times and state what your solution means.



ANSWER _____

CHALLENGE One step up

A streaming service charges $7 plus $3 per rented film. You can spend at least $16 but less than $28 total. Let x be the number of films. Write and solve a compound inequality, graph it, and list every possible number of films.



WORK SPACE AND ANSWER

ANSWER KEY

Shade the Solutions

HIGH SCHOOL · A1.A.2.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve -2 <= 3x + 4 < 13. Graph the solution on the number line.	**-2 <= x < 3; closed circle at -2, open circle at 3, shaded between.**
2	Write a compound inequality for all values from A to B, including A but not B. Graph the solution on the number line.	**-5 <= x < 3; closed circle at A, open circle at B, shaded between.**
3	Solve |x - 4| <= 2. Graph the solution on the number line.	**2 <= x <= 6; closed circles at 2 and 6, shaded between.**
4	A and B are the cutoffs. Write an absolute value inequality for values at A or B or outside them. Graph the solution on the number line.	**|x + 2| >= 6; closed circles at A and B, shaded left of A and right of B.**
5	Solve 5x - 10 > 0 and x + 1 <= 6. Graph the solution on the number line.	**2 < x <= 5; open circle at 2, closed circle at 5, shaded between.**
6	Solve |2x + 4| < 6. Graph the solution on the number line.	**-5 < x < 1; open circles at -5 and 1, shaded between.**

PART 2 · APPLY IT

1. **20 <= x + 5 <= 35, so 15 <= x <= 30. Closed circles at 15 and 30, shaded between. The shirt can cost from $15 to $30, inclusive.** Subtract the $5 shipping charge from each part of the compound inequality.
2. **\|x - 24\| <= 3, so 21 <= x <= 27. Closed circles at 21 and 27, shaded between. A time from 21 to 27 minutes, inclusive, meets the plan.** The run time can differ from 24 minutes by no more than 3 minutes.

CHALLENGE

16 <= 7 + 3x < 28, so 3 <= x < 7. Graph a closed circle at 3, an open circle at 7, and shade between. The possible whole numbers of films are 3, 4, 5, and 6.

Accept equivalent inequality forms and correctly graphed number lines. For the challenge, students must list whole-number film counts, not just the interval.