LESSON MAKER PRO

Where Solutions Live

Solve inequalities and show which values work.

HIGH SCHOOL · A1.A.2

A1.A.2 "Represent and solve real-world and mathematical problems using linear inequalities and compound inequalities; interpret solutions in the original context. Represent relationships using mathematical models with linear inequalities…"

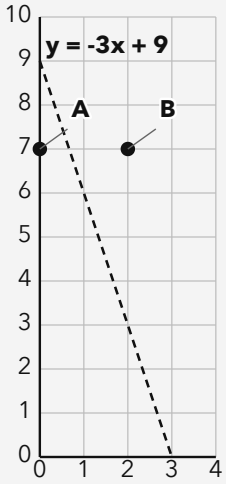
NAME _____ DATE _____

THE BIG IDEA

A linear inequality has a boundary line. Use a solid line for ≤ or ≥ and a dashed line for < or >. Test a point to find which side of the line satisfies the inequality. When solving an inequality, reverse the inequality sign if you multiply or divide by a negative number.

WORKED EXAMPLE

Which plotted point satisfies $y < -3x + 9$?

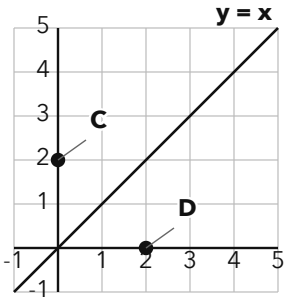


1. Test A: $7 < -3(0) + 9$ becomes $7 < 9$, which is true.
2. Test B: $7 < -3(2) + 9$ becomes $7 < 3$, which is false.
3. The dashed line is not part of the solution because the sign is <.

Answer: A satisfies the inequality; B does not.

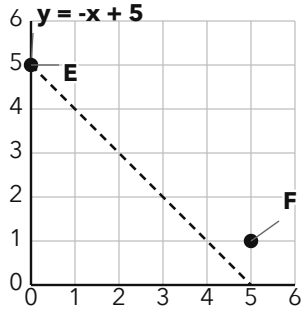
PRACTICE 6 problems

1 Which plotted point satisfies $y \geq x$?



ANSWER _____

2 Which plotted point satisfies $y > -x + 5$? Is point E on the boundary line?



ANSWER _____

3 Solve $4x + 5 \leq 25$.

ANSWER _____

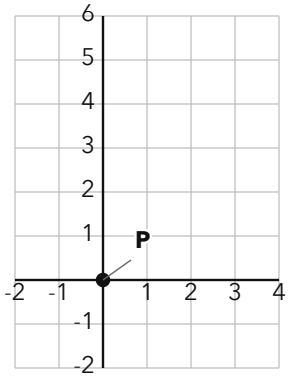
4 Solve $6 - 5x > 16$.

ANSWER _____

5 Solve $-4 \leq 2x + 6 < 12$.

ANSWER _____

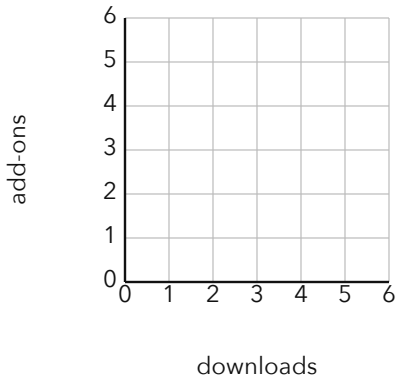
6 Graph $y < 2x + 1$ on the grid. Draw the boundary, shade the solution side, and state whether P is a solution.



ANSWER _____

APPLY IT Show your work

1 You have $18 to spend on song downloads and game add-ons. A download costs $3, and an add-on costs $6. Let x be the number of downloads and y be the number of add-ons. Write an inequality for your budget and graph the possible purchases in the first quadrant. Can you buy 2 of each?



ANSWER _____

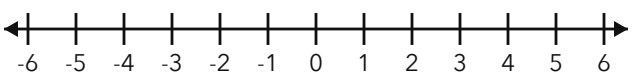
2 Your phone plan allows 17 GB of data this month. You have used 5 GB, and each video download uses 2 GB. Let x be the number of full videos you download next. Write and solve an inequality to find the most videos you can download.

WORK SPACE

ANSWER _____

CHALLENGE One step up

In a game, your score x must be within 4 points of -1 to enter the next round. Write and solve an absolute value inequality. Graph all qualifying scores on the number line.



WORK SPACE AND ANSWER

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Which plotted point satisfies $y \geq x$?	**C only.**
2	Which plotted point satisfies $y > -x + 5$? Is point E on the boundary line?	**F satisfies the inequality. Yes, E is on the boundary line, but it is not a solution.**
3	Solve $4x + 5 \leq 25$.	**$x \leq 5$**
4	Solve $6 - 5x > 16$.	**$x < -2$**
5	Solve $-4 \leq 2x + 6 < 12$.	**$-5 \leq x < 3$**
6	Graph $y < 2x + 1$ on the grid. Draw the boundary, shade the solution side, and state whether P is a solution.	**Draw a dashed line through (0, 1) and (1, 3), then shade below it. P is a solution because $0 < 2(0) + 1$.**

PART 2 · APPLY IT

1. **$3x + 6y \leq 18$, with x and y nonnegative whole numbers. Draw a solid line through (0, 3) and (6, 0), and shade the first-quadrant region on or below it. Yes, 2 of each costs $18.** The total cost cannot exceed $18, so $3x + 6y \leq 18$. Substituting $x = 2$ and $y = 2$ gives $18 \leq 18$.
2. **$5 + 2x \leq 17$, so $x \leq 6$. You can download at most 6 full videos.** Subtract 5 from both sides, then divide by 2. Since x counts full videos, the greatest possible value is 6.

CHALLENGE

$|x + 1| \leq 4$, so $-5 \leq x \leq 3$. Graph closed endpoints at -5 and 3 with the segment between them marked.

Accept equivalent inequalities and correctly graphed regions. For the purchase problem, only nonnegative whole-number points represent actual purchases.