LESSON MAKER PRO

Which Values Work?

Solve inequalities and show their solutions on number lines.

GRADE 8 · PA.A.4.2

PA.A.4.2 "Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form px + q > r and px + q < r, where p, q, and r are rational numbers."

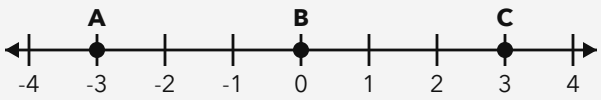
NAME _____ DATE _____

SOLVE AND SHOW

To solve an inequality, undo addition or subtraction, then undo multiplication. If you divide by a negative number, reverse the inequality sign. On a number line, use an open circle for < or >, then shade the values that work.

WORKED EXAMPLE

Solve 7/5 x + 9/10 < 37/10. Which labeled points are solutions? Describe how to graph all solutions on the number line.



1. Subtract 9/10: 7/5 x < 28/10, or 7/5 x < 14/5.
2. Multiply by 5/7: x < 2.
3. A and B are less than 2, so both are solutions.
4. Put an open circle at 2 and shade left.

Answer: x < 2; points A and B; open circle at 2, shaded left

PRACTICE 6 problems

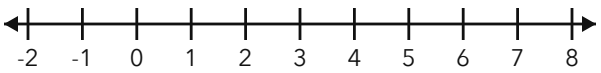
1 Solve 5/2 x - 3/2 > 6.

ANSWER _____

2 Solve -2/3 x + 4 < 8.

ANSWER _____

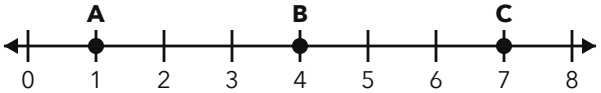
3 Solve -1/2 x + 3/2 > -1. Then graph the solution on this number line.



ANSWER _____

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4 Solve 3/2 x - 1 < 5. Which labeled points on the number line are solutions?



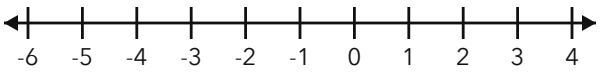
ANSWER _____

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5 Solve -5/4 x + 7/2 < -4.

ANSWER _____

6 Solve 4/3 x + 2/3 < -2. Then graph the solution on this number line.



ANSWER _____

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APPLY IT Show your work

1 A movie ticket costs $8, and each snack costs $2.50. You want to spend less than $23. Let x be the number of snacks. Write and solve an inequality, then find the greatest whole number of snacks you can buy.

WORK SPACE

ANSWER _____

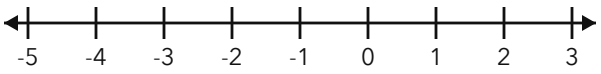
2 Your playlist is 7 minutes long. Each new track adds 5/2 minutes. You want the playlist to be longer than 22 minutes. Let x be the number of new tracks. Write and solve an inequality, then find the fewest whole tracks you need.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student solves -3/2 x + 5/4 > 11/4 and gets x > -1. Explain the student's mistake. Then give the correct solution and graph it on the number line.



WORK SPACE AND ANSWER

ANSWER KEY

Which Values Work?

GRADE 8 · PA.A.4.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve 5/2 x - 3/2 > 6.	**x > 3**
2	Solve -2/3 x + 4 < 8.	**x > -6**
3	Solve -1/2 x + 3/2 > -1. Then graph the solution on this number line.	**x < 5; open circle at 5, shaded left**
4	Solve 3/2 x - 1 < 5. Which labeled points on the number line are solutions?	**x < 4; point A only**
5	Solve -5/4 x + 7/2 < -4.	**x > 6**
6	Solve 4/3 x + 2/3 < -2. Then graph the solution on this number line.	**x < -2; open circle at -2, shaded left**

PART 2 · APPLY IT

1. **8 + 5/2 x < 23; x < 6; at most 5 snacks** Subtract 8 and divide by 5/2 to get x < 6. Since x must be a whole number, the greatest possible value is 5.
2. **7 + 5/2 x > 22; x > 6; at least 7 new tracks** Subtract 7 and divide by 5/2 to get x > 6. The least whole number greater than 6 is 7.

CHALLENGE

The student did not reverse the inequality sign when dividing by -3/2. The correct solution is x < -1, graphed with an open circle at -1 and shading to the left.

Accept equivalent inequality forms in the word problems. For each graph, the boundary must be an open circle, with shading in the correct direction.