LESSON MAKER PRO

Solve and Show

Use equations, inequalities, and number lines to reason about quantities.

GRADE 7 · 7.AF.B.9

7.AF.B.9 "Use variables to represent quantities in real-world or mathematical problems and construct algebraic expressions, equations, and inequalities to solve problems by reasoning about the quantities. a..."

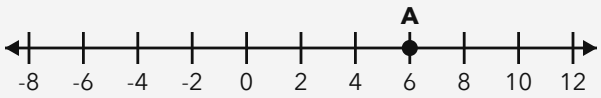
NAME _____ DATE _____

WORK BACKWARD

Let x stand for an unknown quantity. To solve px + q = r, undo addition or subtraction first; to solve p(x + q) = r, undo multiplication first. For inequalities, reverse the sign when you divide by a negative number, and use an open circle when the endpoint is not included.

WORKED EXAMPLE

Solve 6x + 11 < 47. Graph the solution on the number line. Is point A included?



1. Subtract 11 from both sides: 6x < 36.
2. Divide both sides by 6: x < 6.
3. Draw an open circle at A and shade to the left.
4. A is not included because 6 is not less than 6.

Answer: x < 6; point A is not included.

PRACTICE 6 problems

1 Solve 3x + 4 = 19.

ANSWER _____

2 Solve 2(x + 8) = 30.

ANSWER _____

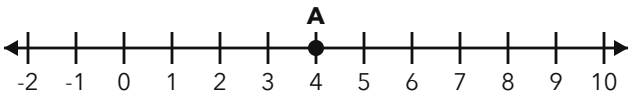
3 Solve 5/2x - 1 = 9.

ANSWER _____

4 Solve -3(x - 4) = -15.

ANSWER _____

5 Solve 4x - 1 > 15. Graph the solution on the number line. Is point A included?



ANSWER _____

_____

6 Solve -2x + 13 > 3. Graph the solution on the number line. Is point A included?



ANSWER _____

_____

APPLY IT Show your work

1 You and a friend split the cost of a board game and a $4 delivery fee equally. Your share is $8. Let x be the price of the game. Write an equation and find the price.

WORK SPACE

ANSWER _____

2 Sticker sheets cost $2.50 each, and shipping costs $3. You must spend less than $20.50. Let x be the number of sheets. Write and solve an inequality, then graph its solution on the number line. Is point A allowed? What is the greatest whole number of sheets you can buy?



ANSWER _____

CHALLENGE One step up

Four friends split the cost of a game and a $5 service fee equally. Each friend pays $9. Let x be the price of the game. Find x using an equation and using arithmetic. State the order of operations you used in each method.

WORK SPACE AND ANSWER

ANSWER KEY # Solve and Show

GRADE 7 · 7.AF.B.9

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve 3x + 4 = 19.	**x = 5**
2	Solve 2(x + 8) = 30.	**x = 7**
3	Solve 5/2x - 1 = 9.	**x = 4**
4	Solve -3(x - 4) = -15.	**x = 9**
5	Solve 4x - 1 > 15. Graph the solution on the number line. Is point A included?	**x > 4; draw an open circle at A and shade right. A is not included.**
6	Solve -2x + 13 > 3. Graph the solution on the number line. Is point A included?	**x < 5; draw an open circle at A and shade left. A is not included.**

PART 2 · APPLY IT

1. **1/2(x + 4) = 8; the game costs $12.** Multiply both sides by 2 to get x + 4 = 16, then subtract 4.
2. **5/2x + 3 < 41/2; x < 7. Draw an open circle at A and shade left. A is not allowed; the greatest whole number is 6 sheets.** Subtract 3 from both sides, then divide by 5/2. Seven sheets cost exactly $20.50, so the strict spending limit allows at most 6 whole sheets.

CHALLENGE

1/4(x + 5) = 9, so x + 5 = 36 and x = 31. The game costs $31. In the algebraic method, multiply both sides by 4, then subtract 5. In the arithmetic method, multiply $9 by 4 to find the total paid, then subtract the $5 fee.

Accept equivalent equations and inequalities. On each graph, the open circle marks a value that is not included, and the shading must extend in the direction stated.