LESSON MAKER PRO

Balance Every Move

Solve equations and inequalities by naming each justified step.

GRADE 8 · 8.PAR.3.4

8.PAR.3.4 "Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality."

NAME _____ DATE _____

JUSTIFY EACH STEP

Keep an equation balanced by doing the same operation to both sides, and name the equality property that allows the move. For an inequality, do the same, but reverse the inequality sign when you multiply or divide by a negative number. Use the Distributive Property and combine like terms when needed before isolating x.

WORKED EXAMPLE

Solve 14x + 23 = 121. Name the property for each move.

1. Subtract 23 from both sides. 14x = 98. (Subtraction Property of Equality)
2. Divide both sides by 14. x = 7. (Division Property of Equality)

Answer: x = 7

PRACTICE 6 problems

1 Solve 6x + 9 = 45. Name the property that justifies each move.

ANSWER _____

2 Solve 9x - 10 = 35. Name the property that justifies each move.

ANSWER _____

3 Solve 8(x + 2) = 64. Name the property that justifies each move.

ANSWER _____

4 Solve 5x + 18 < 48. Name the property that justifies each move.

ANSWER _____

5 Solve -3x + 12 >= -6. Name the property that justifies each move, including any change to the inequality sign.

ANSWER _____

6 Solve 3(x - 4) + 2 = 20. Name the property that justifies each move.

ANSWER _____

APPLY IT Show your work

1 An online game charges 6 tokens to unlock a tournament and 8 tokens for each power-up. You spend 54 tokens total. How many power-ups did you buy? Write an equation and name the equality properties that justify your steps.

WORK SPACE

ANSWER _____

2 A video streaming service has a 6-dollar monthly fee and charges 5 dollars for each movie rental. You can spend no more than 31 dollars. How many rentals can you make? Write an inequality and name the inequality properties that justify your steps.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve 3(2x - 5) + 6 = 2(x + 9) + 12. Then write 2 sentences explaining which properties justify your moves.

WORK SPACE AND ANSWER

ANSWER KEY

Balance Every Move

GRADE 8 · 8.PAR.3.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve 6x + 9 = 45. Name the property that justifies each move.	**x = 6; Subtraction Property of Equality, then Division Property of Equality.**
2	Solve 9x - 10 = 35. Name the property that justifies each move.	**x = 5; Addition Property of Equality, then Division Property of Equality.**
3	Solve 8(x + 2) = 64. Name the property that justifies each move.	**x = 6; Division Property of Equality, then Subtraction Property of Equality.**
4	Solve 5x + 18 < 48. Name the property that justifies each move.	**x < 6; Subtraction Property of Inequality, then Division Property of Inequality.**
5	Solve -3x + 12 >= -6. Name the property that justifies each move, including any change to the inequality sign.	**x <= 6; Subtraction Property of Inequality, then Division Property of Inequality. Reverse the sign when dividing by -3.**
6	Solve 3(x - 4) + 2 = 20. Name the property that justifies each move.	**x = 10; Subtraction Property of Equality, Division Property of Equality, then Addition Property of Equality.**

PART 2 · APPLY IT

1. **x = 6 power-ups.** 6 + 8x = 54; x = 6 power-ups. Subtraction Property of Equality, then Division Property of Equality. Subtract 6 from both sides to get 8x = 48. Divide both sides by 8 to get x = 6.
2. **x <= 5, so you can make at most 5 rentals.** 6 + 5x <= 31; x <= 5, so you can make at most 5 rentals. Subtraction Property of Inequality, then Division Property of Inequality. Subtract 6 from both sides to get 5x <= 25. Divide both sides by 5 to get x <= 5.

CHALLENGE

After using the Distributive Property and combining like terms, I got 6x - 9 = 2x + 30. I used the Subtraction and Addition Properties of Equality to get 4x = 39, then the Division Property of Equality to get x = 39/4.

Accept valid alternative step orders and standard equivalent names for the equality or inequality properties. For the inequality items, accept equivalent wording that clearly states the sign reverses when dividing by a negative number.