LESSON MAKER PRO

Equation Endings

Simplify each equation to find its solution type.

GRADE 8 · 8.PAR.3.2

8.PAR.3.2 "Describe and solve linear equations in one variable with one solution (x = a), infinitely many solutions (a = a), or no solutions (a = b)..."

NAME _____ DATE _____

THREE POSSIBLE ENDINGS

Use properties and inverse operations to make both sides of an equation simpler. A simplified equation can end as x = a, which has one solution, a true statement such as a = a, which has infinitely many solutions, or a false statement such as a = b, which has no solution.

WORKED EXAMPLE

Classify and solve: $7(x + 3) = 7x + 21$

1. Distribute: 7x + 21 = 7x + 21
2. Subtract 7x from both sides: 21 = 21
3. This true statement means every value of x works.

Answer: Infinitely many solutions.

PRACTICE 6 problems

1 Simplify, then state the solution type: 5x - 8 = 2x + 10

ANSWER _____

2 Simplify, then state the solution type: 4(x - 1) = 4x - 4

ANSWER _____

3 Simplify, then state the solution type: 9x + 5 = 9x - 6

ANSWER _____

4 Simplify, then state the solution type: 11 - 2x = 4x + 23

ANSWER _____

5 Simplify, then state the solution type: 6(x + 2) - 5 = 6x + 7

ANSWER _____

6 Simplify, then state the solution type: 8 - 2(x + 4) = -2x + 1

ANSWER _____

APPLY IT Show your work

1 A gaming club compares two monthly server plans. Plan A charges a $12 setup fee plus $5 per month. Plan B charges $8 per month. Let x be the number of months. After how many months will the plans cost the same? State the solution type.

WORK SPACE

ANSWER _____

2 A student council compares two shops for spirit shirts. Shop A charges a $15 setup fee and $9 per shirt. Shop B charges a $27 setup fee and $9 per shirt. Let x be the number of shirts. Can the total costs ever be equal? State the solution type.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Explain why this equation has infinitely many solutions. Show your simplification: -4(2x - 5) + 2x = -6x + 20

WORK SPACE AND ANSWER

ANSWER KEY

Equation Endings

GRADE 8 · 8.PAR.3.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify, then state the solution type: 5x - 8 = 2x + 10	**x = 6, one solution.**
2	Simplify, then state the solution type: 4(x - 1) = 4x - 4	**Infinitely many solutions.**
3	Simplify, then state the solution type: 9x + 5 = 9x - 6	**No solution.**
4	Simplify, then state the solution type: 11 - 2x = 4x + 23	**x = -2, one solution.**
5	Simplify, then state the solution type: 6(x + 2) - 5 = 6x + 7	**Infinitely many solutions.**
6	Simplify, then state the solution type: 8 - 2(x + 4) = -2x + 1	**No solution.**

PART 2 · APPLY IT

1. **x = 4 months, one solution.** Write 12 + 5x = 8x. Subtract 5x to get 12 = 3x, so x = 4.
2. **No solution. The total costs can never be equal.** Write 15 + 9x = 27 + 9x. Subtracting 9x gives 15 = 27, a false statement.

CHALLENGE

-4(2x - 5) + 2x = -8x + 20 + 2x = -6x + 20. The equation becomes -6x + 20 = -6x + 20, so it has infinitely many solutions.

Accept equivalent simplified equations that correctly show x = a, a true statement, or a false statement. For one-solution equations, accept reversed forms such as 6 = x.