LESSON MAKER PRO

System Solver Lab

Use substitution to find the pair that works twice.

GRADE 8 · MA.8.AR.4

MA.8.AR.4 "Develop an understanding of two-variable systems of equations."

NAME _____ DATE _____

MATCH BOTH EQUATIONS

A solution to a system is an ordered pair that makes both equations true. Use substitution by rewriting one equation for one variable, then replacing that variable in the other equation. Check your pair in both equations.

WORKED EXAMPLE

Solve the system: $4x + 3y = 29$; $x + y = 8$.

1. From $x + y = 8$, $y = 8 - x$.
2. Substitute: $4x + 3(8 - x) = 29$.
3. Simplify: $x + 24 = 29$, so $x = 5$.
4. Then $y = 8 - 5 = 3$.

Answer: (x, y) = (5, 3)

PRACTICE 6 problems

1 Solve the system: $x + y = 16$; $x - y = 2$.

ANSWER _____

2 Solve the system: $2x + y = 20$; $x + y = 11$.

ANSWER _____

3 Solve the system: $7x + y = 49$; $x + y = 13$.

ANSWER _____

4 Solve the system: $2x + 7y = 62$; $x + y = 16$.

ANSWER _____

5 Solve the system: $9x + 2y = 81$; $x + y = 16$.

ANSWER _____

6 Solve the system: $11x + 6y = 82$; $x + y = 12$.

ANSWER _____

APPLY IT Show your work

1 For a school game night, 24 tickets are sold. Standard tickets cost $7 each, and VIP tickets cost $13 each. The tickets bring in $228. How many standard tickets and how many VIP tickets are sold?

WORK SPACE

ANSWER _____

2 The art club buys 27 keychains for a fundraiser. Plain keychains cost $6 each, and light-up keychains cost $10 each. The total cost is $202. How many of each type does the club buy?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Without graphing, explain why this system has no solution: $6x + 7y = 41$; $12x + 14y = 85$.

WORK SPACE AND ANSWER

ANSWER KEY # System Solver Lab

GRADE 8 · MA.8.AR.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve the system: x + y = 16; x - y = 2.	**(x, y) = (9, 7)**
2	Solve the system: 2x + y = 20; x + y = 11.	**(x, y) = (9, 2)**
3	Solve the system: 7x + y = 49; x + y = 13.	**(x, y) = (6, 7)**
4	Solve the system: 2x + 7y = 62; x + y = 16.	**(x, y) = (10, 6)**
5	Solve the system: 9x + 2y = 81; x + y = 16.	**(x, y) = (7, 9)**
6	Solve the system: 11x + 6y = 82; x + y = 12.	**(x, y) = (2, 10)**

PART 2 · APPLY IT

1. **14 standard tickets and 10 VIP tickets** Let s be standard tickets and v be VIP tickets. Use s + v = 24 and 7s + 13v = 228; substitute s = 24 - v to get 7(24 - v) + 13v = 228, then 6v = 60, so v = 10 and s = 14.
2. **17 plain keychains and 10 light-up keychains** Let p be plain keychains and l be light-up keychains. Use p + l = 27 and 6p + 10l = 202; substitute p = 27 - l to get 6(27 - l) + 10l = 202, then 4l = 40, so l = 10 and p = 17.

CHALLENGE

No solution. Doubling 6x + 7y = 41 gives 12x + 14y = 82, but the second equation says 12x + 14y = 85. The same expression cannot equal both 82 and 85.

Accept equivalent ordered-pair notation or separate x and y values. For the challenge, accept any explanation that identifies the inconsistent doubled equations.