

System Solver Lab

Use elimination and substitution to solve equation pairs.

GRADE 8 • NY-8.EE.8

NY-8.EE.8 "Analyze and solve pairs of simultaneous linear equations."

NAME _____

DATE _____

SOLVE BOTH EQUATIONS

A solution to a system is an ordered pair that makes both equations true. Use elimination to remove one variable, or use substitution to replace a variable. Check your ordered pair in both original equations.

WORKED EXAMPLE

Solve the system: $x + y = 9$ and $x - y = 3$.

1. Add the equations: $2x = 12$.

2. Divide by 2: $x = 6$.

3. Substitute into $x + y = 9$: $6 + y = 9$, so $y = 3$.

Answer: (6, 3)

PRACTICE 6 problems

1 Solve the system: $x + y = 15$ and $x - y = 5$.

ANSWER _____

2 Solve the system: $2x + y = 23$ and $x + y = 15$.

ANSWER _____

3 Solve the system: $y = 4x - 7$ and $y = x + 8$.

ANSWER _____

4 Solve the system: $5x + 4y = 55$ and $x + y = 12$.

ANSWER _____

5 How many solutions does this system have?
 $2x + 4y = 26$ and $x + 2y = 13$.

ANSWER _____

6 How many solutions does this system have?
 $5x + 10y = 45$ and $x + 2y = 8$.

ANSWER _____

APPLY IT Show your work

- 1** A concert sells full-price tickets for \$13 and student tickets for \$7. The concert sells 15 tickets and collects \$165. How many full-price tickets and student tickets are sold?

WORK SPACE

ANSWER _____

- 2** An esports event sells player passes for \$8 and spectator passes for \$5. It sells 17 passes and collects \$121. How many player passes and spectator passes are sold?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The system $2x + y = 17$ and $4x + 2y = k$ has infinitely many solutions for one value of k . Find k . Then explain what happens when k has any other value.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Solve the system: $x + y = 15$ and $x - y = 5$.	(10, 5)
2	Solve the system: $2x + y = 23$ and $x + y = 15$.	(8, 7)
3	Solve the system: $y = 4x - 7$ and $y = x + 8$.	(5, 13)
4	Solve the system: $5x + 4y = 55$ and $x + y = 12$.	(7, 5)
5	How many solutions does this system have? $2x + 4y = 26$ and $x + 2y = 13$.	Infinitely many solutions.
6	How many solutions does this system have? $5x + 10y = 45$ and $x + 2y = 8$.	No solution.

PART 2 • APPLY IT

- 10 full-price tickets and 5 student tickets** Let x be full-price tickets and y be student tickets. Solve $x + y = 15$ and $13x + 7y = 165$ to get $x = 10$ and $y = 5$.
- 12 player passes and 5 spectator passes** Let x be player passes and y be spectator passes. Solve $x + y = 17$ and $8x + 5y = 121$ to get $x = 12$ and $y = 5$.

CHALLENGE

$k = 34$. When $k = 34$, the second equation is twice the first equation, so there are infinitely many solutions. For any other value of k , the lines are parallel and there is no solution.

Accept ordered pairs written as $x = \text{value}$ and $y = \text{value}$. For the classification items, accept equivalent wording such as "all real-number pairs on the same line" for infinitely many solutions and "zero solutions" for no solution.