LESSON MAKER PRO

# Find the Crossing

*Choose a method and solve each system.*

**GRADE 8 · 8A.AF.D.12**

**8A.AF.D.12** "Select an appropriate method to solve a system of two linear equations in two variables. a. Solve a system of two equations in two variables by using linear combinations..."

NAME _____ DATE _____

### CHOOSE YOUR METHOD

When a variable has opposite coefficients in two equations, add the equations to remove it. If a variable is already alone, substitution may take fewer steps. A table can show where two lines are close, but algebra gives their exact crossing point.

### WORKED EXAMPLE

Solve 4x + 7y = 34 and 9x - 7y = -60.

1. Add the equations: 13x = -26.
2. Divide by 13: x = -2.
3. Substitute: 4(-2) + 7y = 34, so y = 6.

**Answer: (-2, 6)**

## PRACTICE 6 problems

**1** Solve x + y = 11 and x - y = 3.

**ANSWER** _____

**2** Solve 2x + 3y = 16 and 2x - y = 8.

**ANSWER** _____

**3** Solve y = 2x - 3 and 3x + y = 17.

**ANSWER** _____

**4** Solve 3x + 2y = 14 and 5x - 2y = 18.

**ANSWER** _____

**5** Solve x = 3y + 1 and 2x + y = 23. Name the method you chose and tell why it fits.

**ANSWER** _____

**6** Use the table to find the interval containing the crossing's x-value. Then solve the equations algebraically for the exact crossing point.

**VALUES FOR TWO LINES**

| x | y = x + 1 | y = 6 - x |
|---|---|---|
| 1 | 2 | 5 |
| 2 | 3 | 4 |
| 3 | 4 | 3 |
| 4 | 5 | 2 |

**ANSWER** _____

## APPLY IT Show your work

**1** At a school game, 2 pretzels and 3 lemonades cost $19. Four pretzels and 1 lemonade cost $23. What is the price of each?

WORK SPACE

**ANSWER** _____

**2** Student tickets to a school dance cost $2 less than guest tickets. Three student tickets and one guest ticket cost $18. What does each ticket cost?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

Solve 3x + 5y = 21 and 2x - 3y = -5. Explain why linear combinations may take fewer steps than substitution here.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Find the Crossing

**GRADE 8 · 8A.AF.D.12**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Solve x + y = 11 and x - y = 3. | **(7, 4)** |
| 2 | Solve 2x + 3y = 16 and 2x - y = 8. | **(5, 2)** |
| 3 | Solve y = 2x - 3 and 3x + y = 17. | **(4, 5)** |
| 4 | Solve 3x + 2y = 14 and 5x - 2y = 18. | **(4, 1)** |
| 5 | Solve x = 3y + 1 and 2x + y = 23. Name the method you chose and tell why it fits. | **(10, 3); substitution fits because x is already alone.** |
| 6 | Use the table to find the interval containing the crossing's x-value. Then solve the equations algebraically for the exact crossing point. | **2 < x < 3; the exact crossing point is (5/2, 7/2).** |

## PART 2 · APPLY IT

1. **A pretzel costs $5, and a lemonade costs $3.** Let p and l be the prices. Double 2p + 3l = 19, then subtract 4p + l = 23 to get 5l = 15; use l = 3 to find p = 5.
2. **A student ticket costs $4, and a guest ticket costs $6.** Let s and g be the ticket prices. Substitute s = g - 2 into 3s + g = 18 to get 4g - 6 = 18, so g = 6 and s = 4.

## CHALLENGE

**(2, 3). Neither variable is alone, and multiplying the equations can make the x-coefficients match so they can be subtracted.**

Accept any correct algebraic method. For the table problem, students should distinguish the interval shown by the table from the exact point found by algebra.