

Solving Systems by Substitution

Algebra 1 • Section 6.2

Name: _____

Date: _____

Score: _____ / 12

Quick Review and Helpful Hints

A system asks for values that satisfy every relationship at the same time. The solution may be one point, no point, or infinitely many points, depending on how the graphs or equations meet.

▷ **Example:** Solve $y = x + 4$ and $y = 10$.

Work: Substitute 10 for y : $10 = x + 4$, so $x = 6$. The solution is the point where both equations agree.

★ **Answer:** (6, 10)

◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Solve: $y = x + 3, y = 9$.

6. Solve: $y = 4x, y = 20$.

2. Solve: $y = 2x - 1, x + y = 14$.

7. Solve: $a = b - 2, a + b = 10$.

3. Solve: $x = 3y, x + y = 16$.

8. Solve: $y = x^2, y = 16$.

4. Solve: $y = -x + 7, 2x + y = 11$.

9. Solve: $y = 3x + 2, y = x + 10$.

5. Solve: $x = y + 5, x - y = 5$.

10. Solve: $x = 2, y = x + 6$.

◆ Word Problems

11. Adult tickets cost \$8 and student tickets \$5. If $a = s + 6$ and revenue is \$154, find a and s .

12. Two numbers have sum 31. The larger is 5 more than the smaller. Find them.



Answer Keys

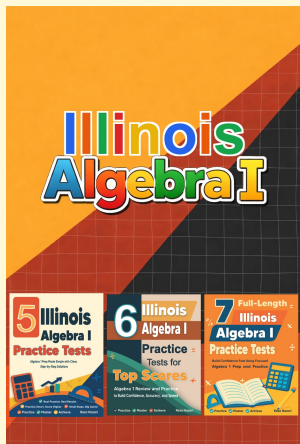
- | | |
|------------------------------|-------------------------|
| 1. (6, 9) | 7. (4, 6) |
| 2. (5, 9) | 8. (-4, 16) and (4, 16) |
| 3. (12, 4) | 9. (4, 14) |
| 4. (4, 3) | 10. (2, 8) |
| 5. Infinitely many solutions | 11. $a = 18, s = 12$ |
| 6. (5, 20) | 12. 13 and 18 |

Step-by-Step Explanations

- Since y is already 9, swap it into the other equation: $9 = x + 3$ leaves $x = 6$.
- One equation hands you y , so drop $2x - 1$ in for y : $3x - 1 = 14$ gives $x = 5$.
- Replace x with $3y$ everywhere; the second equation collapses to $4y = 16$, so $y = 4$.
- Trade y for $-x + 7$ and watch it simplify to $x + 7 = 11$, pinning $x = 4$ and then $y = 3$.
- Rearrange the first and it literally says $x - y = 5$ — the same line twice, so every point works.
- Both name y , so $4x = 20$; one quick divide and $x = 5$.
- Substitute $b - 2$ for a : the sum becomes $2b - 2 = 10$, so $b = 6$ and a follows as 4.
- Setting $x^2 = 16$ — and don't forget, two numbers square to 16, both -4 and 4.
- They share a y , so glue them: $3x + 2 = x + 10$ tidies to $2x = 8$.
- You already know $x = 2$ — just carry it into $y = x + 6$ and the height is 8.
- Trade a for $s + 6$ in the money equation; $8(s + 6) + 5s = 154$ untangles to give $s = 12$.
- Call the small one s , so the big one is $s + 5$; their sum $2s + 5 = 31$ pins $s = 13$.



Want Even More Algebra 1 Practice?



Illinois Algebra I Preparation Bundle

18 full-length practice tests across three books
Fresh test practice, detailed explanations, and
organized review



18 Tests
3 Books
One Bundle

Important: These Algebra 1 resources are made for extra practice after the worksheet. Use the QR code for the state or program bundle connected with this worksheet.

Skill Review

- ✓ Strengthens equations, functions, systems, and modeling
- ✓ Supports steady review before tests
- ✓ Good for tutoring, homework, and independent practice

Build the foundation.

Test Practice

- ✓ Full-length practice tests for realistic pacing
- ✓ Detailed answer explanations for every test
- ✓ Useful after students finish topic worksheets

Practice with purpose.

Confidence

- ✓ Turns mistakes into targeted review
- ✓ Helps students see progress over time
- ✓ Keeps preparation organized and calm

Move forward prepared.