Algebra Review: Systems of Equations

Read the following example problem about solving by the Substitution Method.

Example 1:

$y = 5 - 2x$
$5x - 6y = 21$

Solution:

1) $5x - 6(5 - 2x) = 21$
2) $5x - 30 + 12x = 21$
3) $17x - 30 = 21$
4) $x = 3$
5) $y = 5 - 2(3) = -1$

The solution is $x = 3, y = -1$ or $(3, -1)$

Steps explained here:

1) Substitute $5 - 2x$ for y in the 2nd equation.
2) Distribute.
3) Simplify.
4) Solve by isolating x.
5) Substitute 3 for x in the first equation.

Solve each system of equations by the Substitution Method.
Show ALL work! Use separate paper if needed.

1. $y = 3x$
   $5x + y = 24$

2. $y = 2x + 5$
   $3x - y = 4$

3. $x = 8 + 3y$
   $2x - 5y = 8$

4. $3x + 2y = 71$
   $y = 4 + 2x$

5. $4x - 5y = 92$
   $x = 7y$

6. $y = 3x + 8$
   $x = y$

7. $8x + 3y = 26$
   $2x = y - 4$

8. $x - 7y = 13$
   $3x - 5y = 23$

9. $3x + y = 19$
   $2x - 5y = -10$

Read the following example problem about solving by the Elimination Method.

Example 2:

$3x - y = 13$
$8x + 2y = 44$

Solution:

1) $6x - 2y = 26$
   $8x + 2y = 44$
2) $14x = 70$
3) $x = 5$
4) $3(5) - y = 13$

The solution is $x = 5, y = 2$ or $(5, 2)$

Steps explained here:

1) Multiply the 1st equation by 2 to get the same number and opposite signs on 1 variable.
2) Add the two equations together.
3) Solve for x.
4) Substitute 5 for x in the first equation.

Solve each system by Elimination. Show ALL work! Use separate paper if needed.

10. $5x - y = 20$
    $3x + y = 12$

11. $x + 3y = 7$
    $x + 2y = 4$

12. $3x - 2y = 11$
    $3x - y = 7$

13. $7x + y = 29$
$5x + y = 21$

14. $8x - y = 17$
$6x + y = 11$

15. $9x - 2y = 50$
$6x - 2y = 32$

16. $7y = 2x + 35$
$3y = 2x + 15$

17. $2y = 3x - 1$
$2y = x + 21$

18. $19 = 5x + 2y$
$1 = 3x - 4y$

19. $u + v = 7$
$2u + v = 11$

20. $m - n = -9$
$7m + 2n = 9$

21. $3p - 5q = 6$
$2p - 4q = 4$

22. $4x - 5y = 17$
$3x + 4y = 5$

23. $2c + 6d = 14$
$\frac{1}{2}c - 3d = 8$

24. $3s + 2t = -3$
$s + 1/3t = -4$

Solve each system of equations by using either Substitution or Elimination.

25. $r + 4s = -8$
$3r + 2s = 6$

26. $10m - 9n = 15$
$5m - 4n = 10$

27. $3c - 7d = -3$
$2c + 6d = -34$

28. $6g - 8h = 50$
$4g + 6h = 22$

29. $2p = 7 + q$
$6p - 3q = 24$

30. $3x = -31 + 2y$
$5x + 6y = 23$

31. $3u + 5v = 6$
$2u - 4v = -7$

32. $3a - 2b = -3$
$3a + b = 3$

33. $s + 3t = 27$
$\frac{1}{2}s + 2t = 19$