

3.5 Elimination Method – Solving Systems of Equations

Algebra 1

Solutions

Practice

Which method would be best for solving this system, Substitution or Elimination? Circle the part of the system that justifies your answer.

1. $3x + 9y = 9$
 $x + 3y = 3$

2. $\begin{cases} -3x - 4y = 5 \\ 3x + 2y = -8 \end{cases}$

3. $\begin{cases} 4x - 3y = -14 \\ 6x + 3y = -9 \end{cases}$

4. $\begin{cases} 2x + 3y = 6 \\ x = 3y - 12 \end{cases}$

Substitution

Elimination

Elimination

Substitution

5. $\begin{cases} 3x = y \\ 4x - 2y = 2 \end{cases}$

6. $\begin{cases} 3x - 13y = -11 \\ 5x + y = 5 \end{cases}$

7. $\begin{cases} 8x - 2y = 12 \\ -4x - 5y = 8 \end{cases}$

8. $\begin{cases} 3x + 4y = 10 \\ 5x - 4y = 8 \end{cases}$

Substitution

Substitution

Elimination

Elimination

Solve each system of equations using ELIMINATION.

9. $\begin{cases} 3x - 4y = -2 \\ 4x + 2y = -10 \end{cases}$

$$\begin{array}{r} 3x - 4y = -2 \\ + 8x + 4y = -20 \\ \hline 11x = -22 \\ x = -2 \end{array}$$

$$\begin{array}{r} 4(-2) + 2y = -10 \\ -8 + 2y = -10 \\ 2y = 2 \\ y = -1 \end{array}$$

10. $\begin{array}{r} -8x - 5y = -9 \\ + 8x - 4y = 36 \\ \hline -9y = 27 \end{array}$

$$y = -3$$

$$\begin{array}{r} 2x - (-3) = 9 \\ 2x + 3 = 9 \\ 2x = 6 \\ x = 3 \end{array}$$

11. $\begin{array}{r} 3y - x \\ -7x + 4y \\ \hline -7x \end{array}$

$$\begin{array}{r} 7x - 2 \\ + -7x + 4 \\ \hline -1 \end{array}$$

$$\begin{array}{r} 3(-1) - \\ -3 - \\ - \\ \hline \end{array}$$

12. $\begin{cases} 2x + 6y = 14 \\ -2(x + 3y) = 7 - 2 \end{cases}$

$$\begin{array}{r} 2x + 6y = 14 \\ + -2x - 6y = -14 \\ \hline 0 = 0 \end{array}$$

Infinite Solutions

13. $\begin{cases} 2x + 6y = -2 \\ 3(x - 2y) = 5 - 3 \end{cases}$

$$\begin{array}{r} 2x + 6y = -2 \\ + 3x - 6y = 15 \\ \hline 5x = 13 \\ x = \frac{13}{5} \end{array}$$

$$\begin{array}{r} \frac{13}{5} - 2y = \frac{25}{5} \\ (\frac{-1}{2}) - 2y = \frac{12}{5} \cdot (\frac{-1}{2}) \\ y = -\frac{6}{5} \end{array}$$

14. $\begin{cases} 4x - 3y = -2 \cdot 2 \\ -8x + 6y = -8 \end{cases}$

$$\begin{array}{r} 8x - 6y = -4 \\ + -8x + 6y = -8 \\ \hline 0 = -12 \end{array}$$

No Solution

15. $10x + 5y = -15$
 $3y + 5 = -5x$

$$\begin{aligned} & \text{Red equations:} \\ & 10x + 5y = -15 \\ & -2 \cdot (5x + 3y) = -5 \cdot -2 \\ & 10x + 5y = -15 \\ & + -10x - 6y = 10 \\ & \hline -y = -5 \\ & y = 5 \\ & 3(5) + 5 = -5x \\ & 20 = -5x \\ & -4 = x \end{aligned}$$

16. $\begin{cases} 2x + 4y = -9 \cdot -3 \\ 3x + 5y = -12 \cdot 2 \end{cases}$

$$\begin{aligned} & \begin{array}{r} -6x - 12y = 27 \\ + 6x + 10y = -24 \\ \hline -2y = 3 \end{array} \\ & y = -\frac{3}{2} \\ & 2x + 4(-\frac{3}{2}) = -9 \\ & 2x - 6 = -9 \\ & 2x = -3 \\ & x = -\frac{3}{2} \end{aligned}$$

17. $\begin{cases} 6x + 2y = 4 \cdot 5 \\ -4x - 5y = -10 \cdot 2 \end{cases}$

$$\begin{aligned} & \begin{array}{r} 30x + 10y = 20 \\ + -8x - 10y = -20 \\ \hline 22x = 0 \end{array} \\ & x = 0 \\ & 6(0) + 2y = 4 \\ & 2y = 4 \\ & y = 2 \end{aligned}$$

Simplify each expression

18. $(4p + 3)(3p - 9)$

$$12p^2 - 36p + 9p - 27$$

$$12p^2 - 27p - 27$$

19. $(3a^2 - 4) + (5a^2 - 2)$

add!

$$8a^2 - 6$$

20. $(5c^2 + 2c + 8) - (4c^2 - 5)$

$$\begin{array}{l} \text{Subtract!} \\ 5c^2 + 2c + 8 - 4c^2 + 5 \end{array}$$

$$c^2 + 2c + 13$$