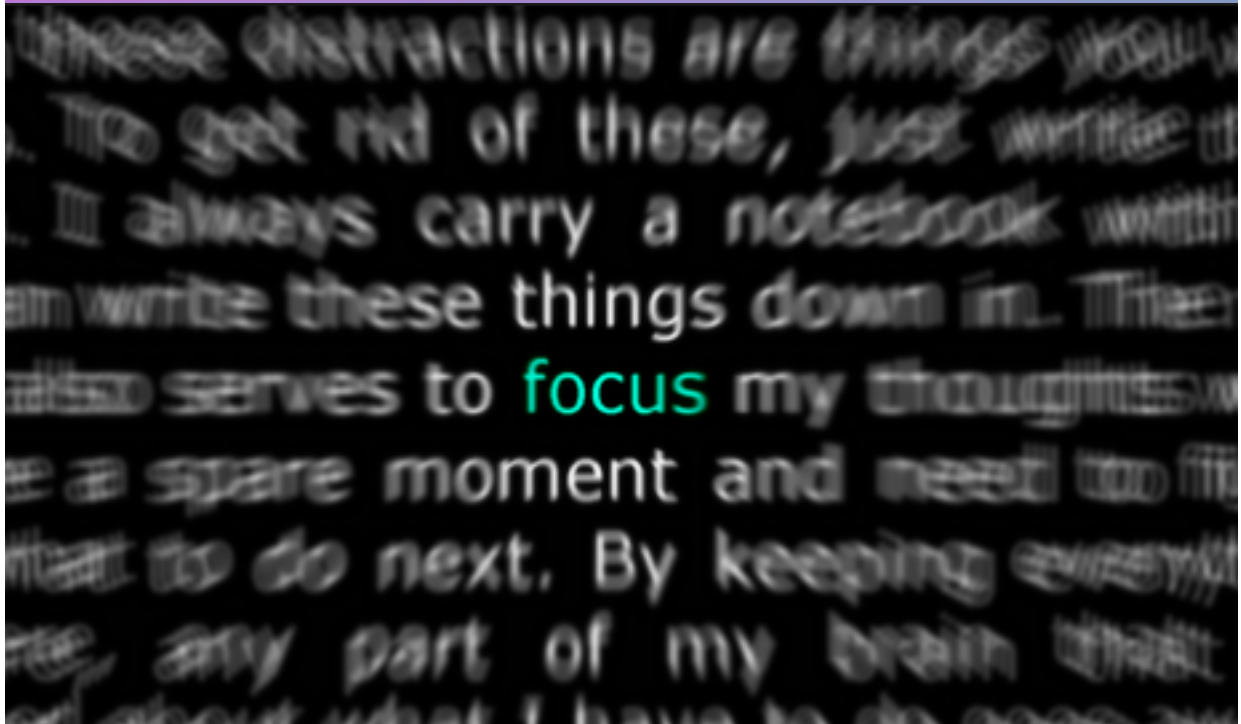


## 3-2 Solving Systems by Elimination



In math, eliminating one variable makes it easier to focus on/solve for another variable.

**Additive Inverse Property:**

$$a + (-a) = 0$$

## Steps:

1. Line up everything: variables & equal signs.
2. Can the system be added together to eliminate a variable? If yes, skip to step 4.
3. Algebraically adjust one/both equations so that coefficients of a specific variable are the same number, with opposite signs.
4. Add and solve for all variables.



*There are many ways to eliminate a variable; look for the easiest.*

Remember what you do to one side of an equation, do to the entire other side.

*Avoid decimals and fractions if possible because they usually lead to mistakes.*

Directions: Solve each system using elimination.

$$\#1 \begin{cases} -2x + 4y = 18 \\ 4x - 2y = 12 \end{cases}$$



Directions: Solve each system using elimination.

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



$$2m = -4n - 4$$

$$3m + 5n = -3$$

$$*(2m + 4n = -4) \cdot 3 \rightarrow$$

$$-6m - 12n = 6$$

$$6m + 12n = -12$$

$$\rightarrow 2m = -4(-3) - 4$$

$$2m = 12 - 4$$

$$2m = 8$$

$$m = 4$$

$$2n = 6$$

$$n = -3$$

$$(4, -3)$$

What should your response be if you end up with something like:

$$-3 = 12$$

→ **No solution**

because

→ **they would be parallel lines.**

What should your response be if you end up with something like:

$$-3 = -3$$

→ **Infinitely many solutions**

because

→ **they would be coinciding lines.**



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*I realize the answers are in the back of the book. I deliberately assigned these problems, so you can check your work. However, you MUST show work to get credit.*

Solve each system by elimination.

$$22. \begin{cases} x + y = 12 \\ x - y = 2 \end{cases}$$

$$25. \begin{cases} 4x + 2y = 4 \\ 6x + 2y = 8 \end{cases}$$

$$28. \begin{cases} 3x + 2y = 6 \\ 3x + 3 = y \end{cases}$$

$$23. \begin{cases} x + 2y = 10 \\ x + y = 6 \end{cases}$$

$$26. \begin{cases} 2w + 5y = -24 \\ 3w - 5y = 14 \end{cases}$$

$$29. \begin{cases} 5x - y = 4 \\ 2x - y = 1 \end{cases}$$

 See Problem 3.

$$24. \begin{cases} 3a + 4b = 9 \\ -3a - 2b = -3 \end{cases}$$

$$27. \begin{cases} 3u + 3v = 15 \\ -2u + 3v = -5 \end{cases}$$

$$30. \begin{cases} 2r + s = 3 \\ 4r - s = 9 \end{cases}$$

Solve each system by elimination.

$$31. \begin{cases} 4x - 6y = -26 \\ -2x + 3y = 13 \end{cases}$$

$$34. \begin{cases} 2x - 3y = 6 \\ 6x - 9y = 9 \end{cases}$$

$$37. \begin{cases} 2x - 3y = -1 \\ 3x + 4y = 8 \end{cases}$$

$$40. \begin{cases} y = 4 - x \\ 3x + y = 6 \end{cases}$$

$$32. \begin{cases} 9a - 3d = 3 \\ -3a + d = -1 \end{cases}$$

$$35. \begin{cases} 20x + 5y = 120 \\ 10x + 7.5y = 80 \end{cases}$$

$$38. \begin{cases} 5x - 2y = -19 \\ 2x + 3y = 0 \end{cases}$$

$$41. \begin{cases} 3x + 2y = 10 \\ 6x + 4y = 15 \end{cases}$$

 See Problems 4 and 5.

$$33. \begin{cases} 2a + 3b = 12 \\ 5a - b = 13 \end{cases}$$

$$36. \begin{cases} 6x - 2y = 11 \\ -9x + 3y = 16 \end{cases}$$

$$39. \begin{cases} r + 3s = 7 \\ 2r - s = 7 \end{cases}$$

$$42. \begin{cases} 3m + 4n = -13 \\ 5m + 6n = -19 \end{cases}$$