Unit 17
Solving Systems of Linear Equations (Elimination)

Math Essentials

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Practice 17.1

Solve the system.

$$-2x + 3y = -16$$
$$2x - 5y = 24$$

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The elimination method **combines** (add OR subtract) the two equations so that one variable is **eliminated**. It is based on the fact that...

- If $a = b$ and $c = d$, then $a + c = b + d$

  Do you agree this is true?

- Try plugging in some numbers to check.

  If 3=3 and 4=4, then 3 + 4 = 3 + 4

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Practice 17.2

1. Solve the system.

$$4x + 3y = 4$$
$$4x + 6y = 16$$

2. Solve the system.

$$-2x + 3y = 1$$
$$-4x + y = -3$$

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Solve a system using elimination.

1. Write both equations in the **form Ax+By=C**.
2. **Multiply one or both equations by appropriate numbers** so that the sum of the coefficients of either variable term is 0 (the coefficients are opposites).
3. **Add the new equations** to eliminate a variable.
4. **Solve the equation** from Step 3 for the remaining variable.
5. **Find the other value.**
6. **Check the values** in both of the original equations.

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Practice 17.3

Solve the following system of equations.

$$-5x + 2y = 16$$
$$-4x - 5y = -7$$

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Practice 17.4

Solve the following system of equations.

$$-0.9x + 1.4y = 8$$
$$3.6x - 0.6y = 3$$

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Practice 17.5

Solve each system.

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

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Practice 17.6

A theater group made appearances in two cities. The hotel charge before tax in the second city was $1500 higher than in the first. The tax in the first city was 9.5%, and the tax in the second city was 5.5% . The total hotel tax paid for the two cities was $682.50. How much was the hotel charge in each city before tax?

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Practice 17.7

A fruit company delivers its fruit in two types of boxes: large and small. A delivery of 7 large boxes and 9 small boxes has a total weight of 157 kilograms. A delivery of 5 large boxes and 3 small boxes has a total weight of 89 kilograms. How much does each type of box weigh?

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