

## Practice and Problem Solving

### Practice by Example

**Example 1**  
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Solve by elimination.

1.  $2x + 5y = 17$   
 $6x - 5y = -9$

4.  $8x + 11y = 20$   
 $5x - 11y = -59$

2.  $7x + 2y = 10$   
 $-7x + y = -16$

5.  $2x + 18y = -9$   
 $4x + 18y = -27$

3.  $2x - 3y = 61$   
 $2x + y = -7$

6.  $20x + 3y = 20$   
 $-20x + 5y = 60$

**Example 2**  
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7. The sum of two numbers is 20. Their difference is 4.
- Write a system of equations that describes this situation.
  - Solve by elimination to find the two numbers.
8. **Ticket Sales** Your school sold 456 tickets for a high school play. An adult ticket cost \$3.50. A student ticket cost \$1. Total ticket sales equaled \$1131. Let  $a$  equal the number of adult tickets sold, and let  $s$  equal the number of student tickets sold.
- Write a system of equations that relates the number of adult and student tickets sold to the total number of tickets sold and to the total ticket sales.
  - Solve by elimination to find the number of each type of ticket sold.

**Example 3**  
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**Solve by elimination.**

- |  |  |  |
|--|--|--|
| 9. $3x - 10y = -25$<br>$4x + 40y = 20$ | 10. $7x + 15y = 32$<br>$x - 3y = 20$   | 11. $x - 8y = 18$<br>$-16x + 16y = -8$ |
| 12. $24x + 2y = 52$<br>$6x - 3y = -36$ | 13. $88x - 5y = 39$<br>$-8x + 3y = -1$ | 14. $2x + 4y = 8$<br>$5x + y = -7$     |

**Example 4**  
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15. **Sales** A photo studio that takes school pictures offers several different packages. Let  $w$  equal the cost of a wallet-sized portrait, and let  $\ell$  equal the cost of an  $8 \times 10$  portrait.



**Basic Package**  
30 wallet-sized photos  
1  $8'' \times 10''$  portrait  
\$17.65



**Deluxe Package**  
20 wallet-sized photos  
3  $8'' \times 10''$  portraits  
\$25.65

- Write a system of equations that relates the cost of wallet-sized portraits and  $8 \times 10$  portraits to the cost of the basic and deluxe packages.
  - Find the cost of each type of portrait.
16. Two groups of students order burritos and tacos at a local restaurant. One order of 3 burritos and 4 tacos costs \$11.33. The other order of 9 burritos and 5 tacos costs \$23.56.
- Write a system of equations that describes this situation.
  - Solve by elimination to find the cost of a burrito and the cost of a taco.

**Example 5**  
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**Solve by elimination.**

- |  |                                      |                                      |
|--|--------------------------------------|--------------------------------------|
| 17. $3x + 2y = -9$<br>$-10x + 5y = -5$ | 18. $4x + 5y = 15$<br>$6x - 4y = 11$ | 19. $3x - 2y = 10$<br>$2x + 3y = -2$ |
| 20. $-2x + 5y = 20$<br>$3x - 7y = -26$ | 21. $10x + 8y = 2$<br>$8x + 6y = 1$  | 22. $9x + 5y = 34$<br>$8x - 2y = -2$ |

**B Apply Your Skills**

**Solve each system using any method. Tell why you chose the method you used.**

- |   |                                       |                                      |
|---|---------------------------------------|--------------------------------------|
| 23. $y = 2x$<br>$y = x - 1$             | 24. $7x + 8y = 25$<br>$9x + 10y = 35$ | 25. $x = 12y - 14$<br>$3y + 2x = 26$ |
| 26. $-20x + 7y = 137$<br>$4x + 5y = 43$ | 27. $5y = x$<br>$2x - 3y = 7$         | 28. $y = x + 2$<br>$y = -2x + 3$     |



29. **Vacation** A weekend at the Beach Bay Hotel in Florida includes 2 nights and 4 meals. A week includes 7 nights and 10 meals. Let  $n$  = the cost of 1 night and  $m$  = the cost of 1 meal. Find the cost of 1 night and the cost of 1 meal.
30. a. **Business** A company sells brass and steel machine parts. One shipment contains 3 brass and 10 steel parts and costs \$48. A second shipment contains 7 brass and 4 steel parts and costs \$54. Find the cost of each type of machine part.  
 b. How much would a shipment containing 10 brass and 13 steel machine parts cost?
31. **Error Analysis** Beth is solving a system by elimination. Her work is shown below. What error did she make?

$$4x - 6y = 1 \longrightarrow 20x - 30y = 5$$

$$3x + 5y = -8 \longrightarrow 18x + 30y = -8$$

32. **Open-Ended** Write a system of equations that can be solved by elimination. Solve your system.

**Solve by elimination.**

33.  $\frac{1}{2}x + y = -1$   
 $16x - \frac{1}{2}y = 163$
34.  $\frac{1}{4}x - 6y = -70$   
 $5x + \frac{3}{4}y = 49$
35.  $-0.2x + 4y = -1$   
 $x + 0.5y = -15.5$
36.  $y = 0.5x + 2$   
 $1.5x + y = 42$
37.  $\frac{1}{4}x + \frac{33}{2} = y$   
 $y - 12 = -2x$
38.  $\frac{2}{3}x - y = 70$   
 $\frac{1}{3}x - \frac{2}{3}y = 43$

39. **Critical Thinking** Find a value of  $n$  such that the  $x$ -value of the solution of the system at right is 4.

$$5x - 10y = 50$$

$$nx + 10y = 6$$

40. **Writing** Explain how to solve a system using elimination. Give examples of when you use addition, subtraction, and multiplication.
41. **Electricity** Two batteries produce a total voltage of 4.5 volts ( $B_1 + B_2 = 4.5$ ). The difference in their voltages is 1.5 volts ( $B_1 - B_2 = 1.5$ ). Find the voltages of the two batteries.

**Challenge**

**Solve by elimination.**

42.  $\frac{6}{x} - \frac{4}{y} = -4$   
 $\frac{3}{x} + \frac{8}{y} = 3$
43.  $ax + y = c$   
 $ax + by = c$
44.  $x + y + z = 41$   
 $x - y + z = 15$   
 $3x - z = 4$

45. **Music** Suppose your band wants to sell CDs and cassette tapes of your music. You use a production company that offers two different production packages.

	CDs	Tapes	Mastering	Artwork	Total Cost
Package #1	300	400	✓	✓	\$2080
Package #2	500	600	✓	✓	\$3120

**Problem Solving Hint**  
 For Exercise 45, simplify each equation before solving by elimination.

Both companies charge \$100 to master your original recording and \$240 to create cover artwork. Find the average production cost of each CD and cassette tape.