Systems of Linear Equations in Two Variables

To use the method of elimination to solve a system of two linear equations in x and y, perform th following steps.

1. Obtain coefficients for x (or y) that differ only in sign by multiplying all terms of one or bo equations by suitably chosen constants.

2. Add the equations to eliminate one variable; solve the resulting equation.

3. Back-substitute the value obtained in Step 2 into either of the original equations and solve the other variable.

4. Check your solution in both of the original equations.

Solve each system by elimination. (Only addition is required.)

1) $-x - 3y = 3$
$x - 9y = 9$

2) $-6x - 5y = 13$
$6x + 3y = -15$

3) $-10x + y = -16$
$3x - y = 2$

4) $6x + 7y = -5$
$-9x - 7y = 11$

5) $-x - y = -14$
$x + y = 14$

6) $-10x + 3y = -30$
$-3x - 3y = -9$

7) $2x + 3y = -12$
$-2x - 5y = 20$

8) $6x + 10y = 24$
$-6x - 10y = -22$

9) $-9x - y = -21$
$6x + y = 12$

10) $7x + 5y = -23$
$4x - 5y = -21$

Solve each system by elimination. (Only subrtaction is required.)

11) $2x - 4y = 14$
$\quad x - 4y = 21$

12) $-x - 9y = -23$
$\quad -x - 2y = -9$

13) $3x + 2y = -12$
$\quad 3x + 3y = -15$

14) $3x + y = -17$
$\quad 3x - 5y = 13$

15) $6x + 2y = 2$
$\quad 6x + 2y = 2$

16) $5x + 5y = -20$
$\quad 5x + 10y = -20$

17) $-10x + 7y = -17$
$\quad -10x + 6y = -16$

18) $-5x - 2y = 13$
$\quad -3x - 2y = 15$

19) $3x + y = 22$
$\quad -10x + y = -30$

20) $4x + 10y = 12$
$\quad 4x + 10y = 18$

Solve each system by elimination. (Multiply one equation first.)

21) $-3x + 3y = 6$
$\quad -9x + 6y = 27$

22) $-18x + 8y = -4$
$\quad -9x + 9y = 18$

23) $-12x + 8y = 4$
$\quad -6x + 7y = -10$

24) $-28x + 8y = 8$
$\quad 7x - 2y = -3$

25) $-3x + 9y = 12$
$\quad -9x - 8y = 1$

26) $-8x - 18y = 6$
$\quad 6x - 9y = -27$

27) $-14x - 2y = -30$
    $-7x - y = -15$

28) $-x + y = -1$
    $8x - 9y = 7$

29) $-x + 2y = -22$
    $7x + 8y = -22$

30) $-12x - 3y = 30$
    $-6x - 7y = 26$

Solve each system by elimination. (Multiply both equations first.)

31) $-6x + 6y = -12$
    $-8x + 8y = -16$

32) $-4x + 3y = -13$
    $10x - 10y = 10$

33) $10x + 3y = -25$
    $-3x - 2y = 13$

34) $7x + 3y = 14$
    $-3x + 7y = -6$

35) $3x + 3y = -12$
    $7x - 5y = -16$

36) $-5x - 5y = 25$
    $-6x - 4y = 14$

37) $-2x + 8y = 14$
    $-7x + 6y = -17$

38) $-9x + 3y = 9$
    $4x - 8y = -4$

39) $-7x + 4y = -30$
    $3x + 9y = -30$

40) $-6x + 9y = 22$
    $10x - 15y = -20$

Word problems: Show all work.

41) The senior classes at High School A and High School B planned separate trips to the county fair. The senior class at High School A rented and filled 9 vans and 8 buses with 485 students. High School B rented and filled 9 vans and 13 buses with 715 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

42) Darryl and Jenny are selling fruit for a school fundraiser. Customers can buy small boxes of oranges and large boxes of oranges. Darryl sold 7 small boxes of oranges and 7 large boxes of oranges for a total of $147. Jenny sold 7 small boxes of oranges and 10 large boxes of oranges for a total of $183. What is the cost each of one small box of oranges and one large box of oranges?

43) Mark and Gabriella are selling cheesecakes for a school fundraiser. Customers can buy New York style cheesecakes and chocolate marble cheesecakes. Mark sold 11 New York style cheesecakes and 10 chocolate marble cheesecakes for a total of $304. Gabriella sold 7 New York style cheesecakes and 2 chocolate marble cheesecakes for a total of $128. What is the cost each of one New York style cheesecake and one chocolate marble cheesecake?

44) Natalie and Cody each improved their yards by planting rose bushes and ornamental grass. They bought their supplies from the same store. Natalie spent $132 on 12 rose bushes and 12 bunches of ornamental grass. Cody spent $84 on 6 rose bushes and 9 bunches of ornamental grass. Find the cost of one rose bush and the cost of one bunch of ornamental grass.

45) Nicole and Willie are selling pies for a school fundraiser. Customers can buy cherry pies and pumpkin pies. Nicole sold 13 cherry pies and 13 pumpkin pies for a total of $312. Willie sold 3 cherry pies and 4 pumpkin pies for a total of $92. What is the cost each of one cherry pie and one pumpkin pie?