

8.2 Practice Set

1. When using elimination to solve a linear three variable system, why does the same variable need to be eliminated when reducing it to two variable system?
2. Give a geometric interpretation of a linear equation in three variables.
3. When you are solving a linear system, how do you know if there is no solution and what does this mean geometrically for a three variable system?
4. What does it mean if you get a true statement like " $0 = 0$ " while solving a three variable linear system? Geometrically, what are the possibilities in this situation?

Solve each of the following systems of equations. If the system is dependent or inconsistent, state this.

$$5. \quad \begin{cases} 10x + 4y - 2z = 8 \\ x - y + z = -8 \\ 2x - 5y + z = -42 \end{cases}$$

$$6. \quad \begin{cases} -3x + 6y + 12z = 24 \\ x + 2y + 4z = 1 \\ 2x + 4y + z = -3 \end{cases}$$

$$7. \quad \begin{cases} 4y = 20 \\ x + y = -1 \\ 4x + 6y - 8z = -42 \end{cases}$$

$$8. \quad \begin{cases} x + 5y - 3z = 2 \\ 4x + 20y - 12z = 8 \\ 2x - 10y + 6z = 4 \end{cases}$$

$$9. \quad \begin{cases} 7x - 2y + 3z = 30 \\ x + y = -36 \\ 3x - 2z = 10 \end{cases}$$

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

$$11. \quad \begin{cases} 6x + 10y - 2z = 6 \\ x - y + z = 15 \\ -3x + 7y - 4z = -24 \end{cases}$$

$$12. \quad \begin{cases} 2x + 3y - z = -1 \\ 6x - 9y + 8z = 29 \\ -4x + 27y - 3z = 4 \end{cases}$$

$$13. \quad \begin{cases} 2x - y + 4z = 39 \\ 8x + 3y - z = 13 \\ 3x - 2y + z = 19 \end{cases}$$

$$14. \quad \begin{cases} 10x + 3y + 5z = 3 \\ -5x - 4y - 20z = 5 \\ 25x - y - 15z = 4 \end{cases}$$

$$15. \quad \begin{cases} \frac{3}{4}x + \frac{1}{2}y - z = 1 \\ \frac{1}{2}x - y + \frac{2}{3}z = 2 \\ x - y + \frac{1}{3}z = 3 \end{cases}$$

Set up a system of equations for each of the following problems. Do not solve.

16. The sum of three numbers is 87. The first number is one less than seven times the second number. The third number is three times the second number. Find the numbers.
17. Three types of coffee are used to make a morning blend. The first type costs \$5.60 per pound, the second type costs \$4.80 per pound and the third type costs \$6.00 per pound. How many pounds of each must be blended in order to make a 2 pound bag costing \$5.45 per pound if the amount of the first blend used is twice the amount of the third blend used?
18. Three investments totaling \$22,500 are earning interest of 2%, 3.5% and 4% respectively. If the second investment is \$2300 more than the first and the three together have earned 400 in interest, how much was invested at each rate?
19. The interior angle measures of a triangle total 180° . If the second angle is four times the first angle and the third angle is 30° less than the first angle, find all three angle measures.
20. The sum of \$7.50 is made up of quarters, dimes, and nickels. There are twice as many dimes as there are quarters and three times as many nickels as dimes. How many of each type of coin are there?

Distributed Practice Problems

Solve each of the following equations.

21. $1.8(6 - x) = 2.4(8 - 3x)$
22. $|7x| + 2 = 16$
23. $\frac{1}{x-5} - \frac{5}{3x+4} = \frac{x^2-6}{3x^2-11x-20}$

$$24. \quad \sqrt{x} - \sqrt{3x - 3} = -1$$

$$25. \quad e^{5x} = 17$$

Perform the indicated operations and/or simplify each of the following expressions completely.

$$26. \quad \frac{4-5i}{7+2i}$$

$$27. \quad \frac{\sqrt{x}-\sqrt{2y}}{\sqrt{3x}+\sqrt{y}}$$

$$28. \quad (5x^{-3}y^2)^{-3}(4x^{-5}y^3)^2$$

$$29. \quad 3(a+b)^2 - 2(a+b)(a-b)$$

$$30. \quad \frac{x^{-1}+y^{-1}}{x^{-2}-y^{-2}}$$