

Chapter Test

In Problems 1–4, solve each system of equations using the method of substitution or the method of elimination. If the system solution, say that it is inconsistent. Verify your result using a graphing utility.

1. $\begin{cases} -2x + y = -7 \\ 4x + 3y = 9 \end{cases}$

2. $\begin{cases} \frac{1}{3}x - 2y = 1 \\ 5x - 30y = 18 \end{cases}$

3. $\begin{cases} x - y + 2z = 5 \\ 3x + 4y - z = -2 \\ 5x + 2y + 3z = 8 \end{cases}$

4. $\begin{cases} 3x + 2y - 8z = \\ -x - \frac{2}{3}y + z = \\ 6x - 3y + 15z = \end{cases}$

5. Write the augmented matrix corresponding to the system of

equations: $\begin{cases} 4x - 5y + z = 0 \\ -2x - y + 6 = -19 \\ x + 5y - 5z = 10 \end{cases}$

6. Write the system of equations corresponding to the

augmented matrix: $\left[\begin{array}{ccc|c} 3 & 2 & 4 & -6 \\ 1 & 0 & 8 & 2 \\ -2 & 1 & 3 & -11 \end{array} \right]$

In Problems 7–10, use the given matrices to compute each expression. Verify your result using a graphing utility.

$A = \begin{bmatrix} 1 & -1 \\ 0 & -4 \\ 3 & 2 \end{bmatrix}$

$B = \begin{bmatrix} 1 & -2 & 5 \\ 0 & 3 & 1 \end{bmatrix}$

$C = \begin{bmatrix} 4 & 6 \\ 1 & -3 \\ -1 & 8 \end{bmatrix}$

7. $2A + C$

8. $A - 3C$

9. AC

10. BA

In Problems 11 and 12, algebraically find the inverse of each nonsingular matrix. Verify your result using a graphing utility.

11. $A = \begin{bmatrix} 3 & 2 \\ 5 & 4 \end{bmatrix}$

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12. $B = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 5 & -1 \\ 2 & 3 & 0 \end{bmatrix}$

In Problems 13–16, solve each system of equations algebraically using matrices. If the system has no solution, say that it is inconsistent. Verify your result using a graphing utility. (MATR, CE)

13. $\begin{cases} 6x + 3y = 12 \\ 2x - y = -2 \end{cases}$

14. $\begin{cases} x + \frac{1}{4}y = 7 \\ 8x + 2y = 56 \end{cases}$

15. $\begin{cases} x + 2y + 4z = -3 \\ 2x + 7y + 15z = -12 \\ 4x + 7y + 13z = -10 \end{cases}$

16. $\begin{cases} 2x + 2y - 3z = 5 \\ x - y + 2z = 8 \\ 3x + 5y - 8z = -2 \end{cases}$

In Problems 17 and 18, find the value of each determinant algebraically. Verify your result using a graphing utility.

17. $\begin{vmatrix} -2 & 5 \\ 3 & 7 \end{vmatrix}$

18. $\begin{vmatrix} 2 & -4 & 6 \\ 1 & 4 & 0 \\ -1 & 2 & -4 \end{vmatrix}$

In Problems 19 and 20, use Cramer's Rule, if possible, to solve each system.

19. $\begin{cases} 4x + 3y = -23 \\ 3x - 5y = 19 \end{cases}$

20. $\begin{cases} 4x - 3y + 2z = 15 \\ -2x + y - 3z = -15 \\ 5x - 5y + 2z = 18 \end{cases}$

In Problems 21–23, solve each system of equations algebraically.

21. $\begin{cases} 3x^2 + y^2 = 12 \\ y^2 = 9x \end{cases}$

22. $\begin{cases} 2y^2 - 3x^2 = 5 \\ y - x = 1 \end{cases}$

23. Graph the system of inequalities: $\begin{cases} x^2 + y^2 \leq 100 \\ 4x - 3y \geq 0 \end{cases}$

In Problems 24 and 25, write the partial fraction decomposition of each rational expression.

24. $\frac{3x + 7}{(x + 3)^2}$

25. $\frac{4x^2 - 3}{x(x^2 + 3)^2}$

26. Graph the system of inequalities. Tell whether the graph is bounded or unbounded, and label all corner points.

$\begin{cases} x \geq 0 \\ y \geq 0 \\ x + 2y \geq 8 \\ 2x - 3y \geq 2 \end{cases}$

27. Maximize $z = 5x + 8y$

subject to $x \geq 0$, $2x + y \leq 8$, and $x - 3y \leq -3$.

28. Megan went clothes shopping and bought 2 pairs of flare jeans, 2 camisoles, and 4 t-shirts for \$90.00. At the same store, Paige bought one pair of flare jeans and 3 t-shirts for \$42.50 while Kara bought 1 pair of flare jeans, 3 camisoles, and 2 t-shirts for \$62.00. Determine the price of each cloth-

$$5. \left[\begin{array}{ccc|c} 4 & -5 & 1 & 0 \\ -2 & -1 & 6 & -19 \\ 1 & 5 & -5 & 10 \end{array} \right]$$

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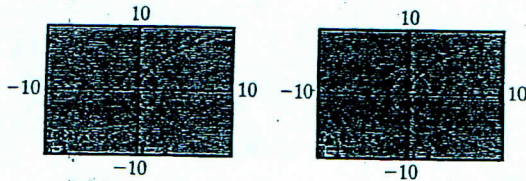
1. $x=3, y=-1$ 2. Inconsistent. 3. $x = -z + \frac{18}{7}, y = z - \frac{17}{7}$ where z can be any real number. 4. $x = \frac{1}{3}, y = -2, z = 0$

5. ~~$\left[\begin{array}{ccc|c} 1 & -5 & 1 & 0 \\ -2 & -1 & 6 & -19 \\ 1 & 5 & -5 & 10 \end{array} \right]$~~ 6. $\begin{cases} 3x + 2y + 4z = -6 \\ 1x + 0y + 8z = 2 \\ -2x + 1y + 3z = -11 \end{cases}$ or $\begin{cases} 3x + 2y + 4z = -6 \\ x + 8z = 2 \\ -2x + y + 3z = -11 \end{cases}$ 7. $\begin{bmatrix} 6 & 4 \\ 1 & -11 \\ 5 & 12 \end{bmatrix}$ 8. $\begin{bmatrix} -11 & -19 \\ -3 & 5 \\ 6 & -22 \end{bmatrix}$

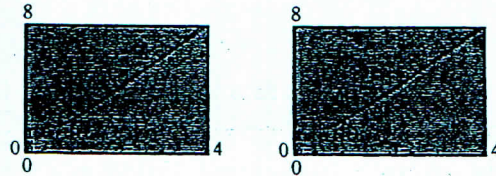
9. The operation cannot be performed. 10. $\begin{bmatrix} 16 & 17 \\ 3 & -10 \end{bmatrix}$ 11. $\begin{bmatrix} 2 & -1 \\ -5 & 3 \\ -2 & 2 \end{bmatrix}$ 12. $B^{-1} = \begin{bmatrix} 3 & 3 & -4 \\ -2 & -2 & 3 \\ -4 & -5 & 7 \end{bmatrix}$ 13. $x = \frac{1}{2}, y = 3$

14. The system is dependent and therefore has an infinite number of solutions. Any ordered pair satisfying the equation $x = \frac{1}{4}y - 7$ or $y = -4x + 28$, is a solution to the system. 15. $x=1, y=-2, z=0$ 16. Inconsistent 17. -29 18. -12 19. $x=-2, y=-5$ 20. $x=1, y=-1, z=4$

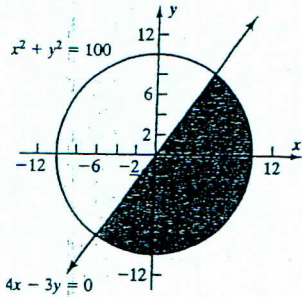
21. (1, -3) and (1, 3)



22. (3, 4) and (1, 2)



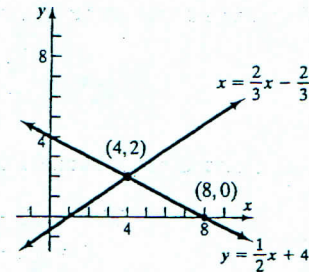
23.



24. $\frac{3}{x+3} + \frac{-2}{(x+3)^2}$

25. $\frac{-1}{3} + \frac{\frac{1}{3}x}{(x^2+3)} + \frac{5x}{(x^2+3)^2}$

26. The graph is unbounded. The corner points are (4, 2) and (8, 0)



27) MAX VALUE OF $Z = 64$ at (0, 8)

28) Flare jeans cost \$24.50,
Camisoles cost \$8.50,
t-shirts cost \$6.00