

Matrices (Chapter 4) Study Guide

Name: _____

Period: _____

Directions: Evaluate each expression **without using a graphing calculator**.

$$A = \begin{bmatrix} 6 & -2 \end{bmatrix} \quad B = \begin{bmatrix} -4 & 0 \\ 3 & 2 \end{bmatrix} \quad C = \begin{bmatrix} 7 & -1 \\ -2 & 5 \end{bmatrix} \quad D = \begin{bmatrix} -3 & 9 & 0 \\ 2 & -1 & -6 \end{bmatrix} \quad E = \begin{bmatrix} 3 & -4 & 1 \\ 0 & 5 & -2 \end{bmatrix}$$

1. $B + C =$

2. $D - E =$

3. $4A =$

4. $B + 3C =$

5. $2E - 3D =$

6. $5A + 3D =$

7. $AB =$

8. $BC =$

9. $EC =$

10. $AD =$

Directions: Find the value of each variable.

$$11. \begin{bmatrix} 9 & a \\ -4 & 3 \end{bmatrix} + \begin{bmatrix} -6 & 7 \\ b & 2 \end{bmatrix} = \begin{bmatrix} 3 & 4 \\ 5 & 5 \end{bmatrix}$$

$$12. \begin{bmatrix} 12 & 7 \\ c & -2 \\ 0 & -9 \end{bmatrix} - \begin{bmatrix} -2 & 5 \\ -6 & 4 \\ -5 & d \end{bmatrix} = \begin{bmatrix} 14 & 2 \\ 3 & -6 \\ 5 & -1 \end{bmatrix}$$

$$13. \begin{bmatrix} 4 & 7 \\ e & -2 \end{bmatrix} \cdot \begin{bmatrix} -1 & 3 \\ 6 & f \end{bmatrix} = \begin{bmatrix} 38 & 12 \\ -9 & -9 \end{bmatrix}$$

$$14. \begin{bmatrix} 3 & g & -8 \\ -4 & 5 & 3 \end{bmatrix} \cdot \begin{bmatrix} 1 & 6 \\ -2 & -3 \\ 4 & h \end{bmatrix} = \begin{bmatrix} -25 & 80 \\ -2 & -60 \end{bmatrix}$$

Directions: Find the determinant for each matrix using a regular calculator for the 2 by 2 and a graphing calculator for the 3 by 3 matrices.

$$15. \begin{bmatrix} 4 & -8 \\ 5 & -3 \end{bmatrix}$$

$$16. \begin{bmatrix} -7 & 10 \\ -4 & 9 \end{bmatrix}$$

$$17. \begin{bmatrix} 3 & 0 & -5 \\ 9 & 2 & -7 \\ -1 & 4 & 8 \end{bmatrix}$$

$$18. \begin{bmatrix} -5 & -2 & 13 \\ 8 & -13 & 6 \\ 10 & -7 & -11 \end{bmatrix}$$

Directions: Use a graphing calculator to find the inverse of each matrix, if it exists.

19. $\begin{bmatrix} -8 & 5 \\ 5 & -3 \end{bmatrix}$

20. $\begin{bmatrix} 5 & 4 \\ 8 & 6 \end{bmatrix}$

21. $\begin{bmatrix} 10 & -15 \\ -6 & 9 \end{bmatrix}$

22. $\begin{bmatrix} 7 & 2 & 1 \\ 0 & 3 & -1 \\ -3 & 4 & -2 \end{bmatrix}$

Directions: Write the matrices for each system as if they would be solved using inverses, then solve.

23.
$$\begin{aligned} 3x + 5y &= 11 \\ 5x - 4y &= 43 \end{aligned}$$

24.
$$\begin{aligned} y &= 5x + 9 \\ 3x + 7y &= -51 \end{aligned}$$

25.
$$\begin{aligned} 4x + 3y - 2z &= -2 \\ 3x - 7y &= -54 \\ 6x - y + 5z &= -20 \end{aligned}$$

26.
$$\begin{aligned} 11x - 7y - 9z &= -105 \\ 8x - 2y + 19z &= -119 \\ 17x + 13y + 5z &= 43 \end{aligned}$$

Directions: Write the augmented matrix for each system of equations then solve by using row reduction echelon form (rref).

27. $3x + 5y = 21$
 $5x - 7y = -11$

28. $8x - 9y = 3$
 $12x + 5y = 51$

29. $x - 5y + 3z = 41$
 $-5x + 2y + 2z = -39$
 $4x - 3y - 2z = 37$

30. $4x + z = 13$
 $7y - 5z = 9$
 $8x - 3y = 18$

31. Laura is a ticket manager at Worlds of Fun Theme Park. She counted that on Monday, 474 children's tickets were sold, 784 adult tickets were sold, and 187 senior tickets were sold. The revenue for the day was \$37,675. On Tuesday, there were 512 children's tickets sold, 884 adult tickets sold, and 235 senior tickets sold for a revenue of \$42,635. On Wednesday, there were fewer people because of the rain in the late afternoon. There were 430 children, 652 adults, and 139 senior citizens for a total of \$31,635.
- Write a system of equations to represent this situation.
 - Use either Cramer's Rule, inverse matrices, or row reduction echelon form (rref) to determine the cost of each ticket.