Name: _____ Date: _____ Period: _____ Score _____

Sec 1H Unit 7 Review: Matrices

Perform the given operation with the given matrices.

1. $\begin{bmatrix}3 & 4\\5 & -1\\2 & 6\end{bmatrix}+\begin{bmatrix}3 & 4\\5 & -1\\2 & 6\end{bmatrix}$

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

3. $-3\begin{bmatrix}1 & 1\\2 & -3\\4 & -5\end{bmatrix}$

K = $\begin{bmatrix}-3 & 1 & 7 & 0\\2 & 93 & 6 & -1\\4 & -5 & 0 & 1.8\end{bmatrix}$

4. Write the additive identity for matrix K:

5. Write the additive inverse for matrix K:

W = $\begin{bmatrix}8 & -1 & 6 & -50\\4 & 0 & 23 & 0\\0 & -5 & 21 & 3\end{bmatrix}$

6. Find W – K

7. Find 2K + W

8. What are the dimensions of matrix P?

9. What is element $P_{4,3}$?

P = $\begin{bmatrix}3 & 1 & 0 & 2 & 3 & 8 & 1 & 1 & 3\\1 & 0 & 0 & 7 & 1 & 2 & 2 & 3 & 3\\2 & 2 & 0 & 0 & 6 & 7 & 1 & 2 & 2\\2 & 3 & 10 & 0 & 4 & 6 & 1 & 0 & 5\\2 & 2 & 1 & 4 & 3 & 2 & 1 & 6 & 0\\4 & 4 & 5 & 3 & 9 & 6 & 1 & 6 & 1\end{bmatrix}$

Find the determinants:

10. $\begin{vmatrix}14 & 9\\-5 & -3\end{vmatrix}$

11. $\begin{vmatrix}15 & 9\\-5 & -3\end{vmatrix}$

12. $\begin{vmatrix}0 & 4 & 6\\3 & 7 & 1\\-2 & 0 & -8\end{vmatrix}$

13. Solve for x: $\begin{vmatrix}-3 & 4\\x & -9\end{vmatrix}=32$

Perform the following multiplications if possible:

14. BA

15. FD

16. EH

17. JK

18. CJ

$$A = \begin{bmatrix} 1 & 2 \\ -3 & 1 \end{bmatrix} \qquad B = \begin{bmatrix} 11 & -1 \\ 4 & 3 \end{bmatrix}$$

$$C = \begin{bmatrix} 2 & 1 & 3 \\ 4 & 1 & 7 \end{bmatrix} \qquad D = \begin{bmatrix} -1 & 0 & 4 \\ 3 & 1 & 1 \end{bmatrix}$$

$$E = \begin{bmatrix} 1 & -1 \\ -2 & 0 \\ 1 & -2 \end{bmatrix} \qquad F = \begin{bmatrix} -5 & 2 \\ -1 & 3 \\ 4 & -4 \end{bmatrix}$$

$$G = \begin{bmatrix} 1 & 0 & 1 \\ 3 & -1 & -2 \\ 0 & 2 & -1 \end{bmatrix} \qquad H = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ 3 & 1 & 2 \end{bmatrix}$$

$$J = \begin{bmatrix} 4 \\ 9 \end{bmatrix} \qquad K = \begin{bmatrix} 8 & 0 & -3 \end{bmatrix}$$

19. If M = GH, then find $M_{3,2}$ without multiplying all of G*H.

Write an augmented matrix for each system of linear equations:

20. $\begin{cases} x + 2y = -4 \\ 5x - y = 19 \end{cases}$

21. $\begin{cases} -3x + 2y + z = 14 \\ -5x + 48y = -20 \\ 7x - 3y - 9z = 6 \end{cases}$

Write the system of equations that generated each matrix:

22. $\begin{bmatrix} 0 & 4 & -5 \\ 7 & -3 & 8 \end{bmatrix}$

23. $\begin{bmatrix} 1 & 2 & 3 & 8 \\ -4 & 0 & 6 & 9 \\ 5 & -7 & 1 & 2 \end{bmatrix}$

Stop being afraid of what could go wrong and start being excited about what could go right.

Solve the following systems using matrix row reduction:

24. $\begin{cases} 6x + 6y = -6 \\ 5x + y = -13 \end{cases}$

25. $\begin{cases} -2x + 6y = 6 \\ -7x + 8y = -5 \end{cases}$

Use the value of the determinant to decide if the system of equations will have one solution. **Do NOT actually solve it**.

26. $\begin{cases} 6x - 8y = 57 \\ -3x + 4y = 0 \end{cases}$

determinant =

one solution? yes / no

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

determinant =

one solution? yes / no

28. $\begin{cases} 5x - 2y - 7z = 0 \\ -x + 8y + 3z = 6 \\ 2y + 4z = -10 \end{cases}$

determinant =

one solution? yes / no

Use the above determinants to determine whether the matrices from #26 - #28 have inverses:

29. inverse? yes / no

30. inverse? yes / no

31. inverse? yes / no

32. Write I_2 and I_3

Use the formula for the inverse of a 2x2 matrix to find the inverse of each matrix:

33. $\begin{bmatrix} 6 & 8 \\ -4 & -2 \end{bmatrix}$

34. $\begin{bmatrix} 4 & -2 \\ -2 & 1 \end{bmatrix}$

35. $\begin{bmatrix} -2 & 5 \\ 3 & -7 \end{bmatrix}$

36. Use augmented matrices and row operations to find the inverse of $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$:

37. Use the inverse you found in #36 to solve this system of equations using inverse matrices: $\begin{cases} x + 2y = 4 \\ 3x + 4y = 10 \end{cases}$

38. The inverse of matrix M = $\begin{bmatrix} -7 & -11 & 10 \\ 6 & 9 & -8 \\ -2 & -3 & 3 \end{bmatrix}$ is $M^{-1} = \begin{bmatrix} 3 & 3 & -2 \\ -2 & -1 & 4 \\ 0 & 1 & 3 \end{bmatrix}$

Use this information to solve the following system of equations using inverse matrices: $\begin{cases} -7x - 11y + 10z = -4 \\ 6x + 9y - 8z = 18 \\ -2x - 3y + 3z = 20 \end{cases}$

39. What is the solution to the system represented by this matrix? $\begin{bmatrix} 1 & 0 & 3 \\ 8 & 1 & 24 \end{bmatrix}$