Precalculus Unit 9 Review

Name _____ period _____ date _____

For questions 1-3, do the following:

a) Write the system of equations corresponding to the reduced matrix.
b) State whether the system is consistent or inconsistent.
c) State how many solutions it has.
d) Give the solution set.

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

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

3. $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 3 & 4 \\ 0 & 0 & 0 & 0 \end{array}\right]$

4. Perform the requested row operation on the matrix $\left[\begin{array}{ccc|c} 2 & 4 & 5 & -2 \\ 1 & 2 & 3 & 4 \\ 3 & 3 & 7 & 1 \end{array}\right]$. $R_2 = -3r_2 + r_3$.

5. Solve the system of equations using row operations. If the system has no solution, say that it is inconsistent. $\begin{cases} 2x - 3y = 5 \\ x + 4y = -7 \end{cases}$.

6. Find the value of the determinant by hand: $\begin{vmatrix} 3 & 5 \\ -2 & 7 \end{vmatrix}$.

7. Solve for x: $\begin{vmatrix} 2 & -5 \\ 4 & x \end{vmatrix} = 6.$

8. Find the value of the determinant by hand: $\begin{vmatrix} -1 & 2 & 1 \\ 2 & -2 & 3 \\ 3 & -1 & 0 \end{vmatrix}$.

9. Solve using Cramer's Rule. If Cramer's Rule is not applicable, say so: $\begin{cases} 2x - 4y = -2 \\ 3x + 2y = 3 \end{cases}$

10. Given that D, the determinant of the coefficient matrix is equal to 10, use Cramer's Rule to find the value of z. Do not solve for x or y. $\begin{cases} 2x - y + z = 3 \\ x - y - z = 4 \\ x + 2y - 2z = 1 \end{cases}$.

Use the following matrices to answer questions 11-13: $A = \begin{bmatrix} 2 & 1 \\ 4 & -3 \end{bmatrix}$. $B = \begin{bmatrix} -3 & 4 \\ -2 & 7 \end{bmatrix}$.

11. Find $A + B$.

12. Find $3A - 2B$.

13. Find $I_2 - 4A$.

14. Compute the product: $\begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 4 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 \\ -1 & 0 \\ 2 & 4 \end{bmatrix}$

15. Compute the product: $\begin{bmatrix} 1 & 0 \\ -4 & 5 \\ 3 & -9 \end{bmatrix} \cdot \begin{bmatrix} 2 & 3 & 5 \\ 11 & 2 & -7 \\ 8 & 0 & 1 \end{bmatrix}$

16. Find the inverse of the matrix by hand: $A = \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$.

17. Solve the system using the inverse matrix method: $\begin{cases} x+2y+3z=2 \\ x+y+z=-3 \\ -x+y+2z=4 \end{cases}$.

The inverse of $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 1 \\ -1 & 1 & 2 \end{bmatrix}$ is $\begin{bmatrix} 1 & -1 & -1 \\ -3 & 5 & 2 \\ 2 & -3 & -1 \end{bmatrix}$.

For questions 18-21, find the partial fraction decomposition.

18. $\dfrac{2x-1}{(x-2)(x+4)}$

19. $\dfrac{x}{x^2+7x+12}$

20. $\dfrac{7x^2-11x-10}{(x+1)(x-1)^2}$

21. $\dfrac{20x+21}{(x-3)(x^2+3x+9)}$