Matrices Review

For the following matrices: 1) state the dimensions of the matrix and
2) state the value of the given element.

1. $\begin{bmatrix} 2 & -1 & 4 & 8 & 9 \\ -3 & 3 & 0 & 7 & -6 \\ -9 & -2 & 5 & 6 & 1 \end{bmatrix}$; a_{32}

2. $\begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ 6 & 7 & 8 & 9 & 10 & 11 \end{bmatrix}$; a_{14}

3. $\begin{bmatrix} 2 \\ 4 \\ 8 \end{bmatrix}$ is a _____ matrix, $\begin{bmatrix} 2 & 4 & 8 \end{bmatrix}$ is a _____ matrix,

$\begin{bmatrix} 2 & 4 \\ 8 & 2 \end{bmatrix}$ is a _____ matrix, $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ is an _____ matrix

Perform the following matrix operations. If not possible, state "not possible".

4. $\begin{bmatrix} 2 & -1 & 7 \end{bmatrix} \times \begin{bmatrix} 8 \\ 2 \\ -3 \end{bmatrix}$

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

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

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

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

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

Find the given determinants.

11. $\begin{vmatrix} 7 & 3 \\ -1 & 2 \end{vmatrix}$
12. $\begin{vmatrix} -3 & 4 \\ -2 & 0 \end{vmatrix}$
13. $\begin{vmatrix} 2 & -1 & 3 \\ 4 & 0 & -2 \\ 5 & 1 & 2 \end{vmatrix}$

Solve the system of equations by Cramer's Rule:

14. $\begin{aligned} 2x - 5y &= -4 \\ x + y &= 5 \end{aligned}$
15. $\begin{aligned} 4x + 5y &= 1 \\ 2x - 3y &= -5 \end{aligned}$

Find the inverse of the matrix if possible.

16. $A = \begin{bmatrix} 2 & -1 \\ 7 & 8 \end{bmatrix}$
17. $B = \begin{bmatrix} 3 & 1 \\ 0 & 5 \end{bmatrix}$
18. $C = \begin{bmatrix} 2 & 3 \\ 4 & -6 \end{bmatrix}$

For each problem:
    a) Write the system of equations in matrix form
    b) Solve the system of equations

19. $\begin{aligned} 2x - 5y &= -4 \\ x + y &= 5 \end{aligned}$
20. $\begin{aligned} 4x + 5y &= 1 \\ 2x - 3y &= -5 \end{aligned}$