Handout 1 - The Old Switcheroo and Who's Who in the Matrix - Answers

1. Express $3x - 2y = 5$ and $-x + 4y = 1$ using matrices.

   Ans: $\begin{bmatrix} 3x & -2y \\ -x & 4y \end{bmatrix} = \begin{bmatrix} 5 \\ 1 \end{bmatrix}$

2. Express these as equations: $\begin{bmatrix} x & -y \\ 3x & 4y \end{bmatrix} \begin{bmatrix} -6 \\ 2 \end{bmatrix}$

   Ans: $x - y = -6$, $3x + 4y = 2$.

3. In this matrix $\begin{bmatrix} 3 & -5 & 1 \\ -2 & 0 & 4 \end{bmatrix}$ what is in row one?

   Ans: Row one: 3 -5 1

4. In this matrix $\begin{bmatrix} 3 & -5 & 1 \\ -2 & 0 & 4 \end{bmatrix}$ what is in column two?

   Ans: Column two: -5 0

5. In this matrix $\begin{bmatrix} 3 & -5 & 1 \\ -2 & 0 & 4 \end{bmatrix}$ which entry is -5?

   Ans: e_{12}

6. In this matrix $\begin{bmatrix} 3 & -5 & 1 \\ -2 & 0 & 4 \end{bmatrix}$, what is e_{23}?

   Ans: 4

7. In this matrix $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$, what is e_{23}?

   Ans: Identity matrix

8. Express $2x - 2y + 3z = 5$, $3x + 4y + z = 8$ and $-4x - 2y - 2z = 8$ using matrices.

   Ans: $\begin{bmatrix} 2x & -2y & 3z \\ 3x & 4y & z \\ -4x & -2y & -2z \end{bmatrix} = \begin{bmatrix} 5 \\ 8 \\ 8 \end{bmatrix}$

9. Express these matrices as equations:
   $\begin{bmatrix} x & 2y & 5z \\ -5x & -3y & -z \\ -4x & 4y & -2z \end{bmatrix} = \begin{bmatrix} 6 \\ 9 \\ 8 \end{bmatrix}$

   Ans: $x + 2y + x = 6$, $-5x - 3y - z = 9$, $-4x + 4y - 2z = 8$.

10. What is the formula for location of entries?

    Ans: e_{rc}