

This homework is due on **August 30**.

1. Are the following systems of linear equations consistent? If yes, then find a solution.

(a) $x + 2y = 8$ $3x - 4y = 4$

(b) $2x - 3y + 4z = -12$ $x - 2y + z = -5$ $3x + y + 2z = 1$

(c) $x + 3y = -4$ $2x + 5y = -8$ $x + 3y = -5$

2. Let

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 0 \\ 2 & 1 \\ 3 & 2 \end{pmatrix} \quad C = \begin{pmatrix} 3 & -1 & 3 \\ 4 & 1 & 5 \\ 2 & 1 & 3 \end{pmatrix} \quad D = \begin{pmatrix} 3 & -2 \\ 2 & 4 \end{pmatrix}$$
$$E = \begin{pmatrix} 2 & -4 & 5 \\ 0 & 1 & 4 \\ 3 & 2 & 1 \end{pmatrix} \quad F = \begin{pmatrix} -4 & 5 \\ 2 & 3 \end{pmatrix}$$

If possible compute the indicated linear combinations

(a) $2B + F$

(b) $3D + 2F$

(c) $(C + E)^T$

(d) A^T and $(A^T)^T$

(e) $A^T + 2B^T$

3. Let $\mathbf{a} = \mathbf{b} = \begin{pmatrix} -3 \\ 2 \\ x \end{pmatrix}$. If $\mathbf{a} \cdot \mathbf{b} = 17$, then find x .

4. Let A, B, C, D, E be the matrices from Problem (2) above. If possible compute the following

(a) AB and BA

(b) $DA + B$

(c) $A(C + 3E)$

(d) $C^T B$

5. Determine a constant k such that $(kA)^T(kA) = 1$, where $A = \begin{pmatrix} -2 \\ 1 \\ -1 \end{pmatrix}$. Is there more than one value of k that could be used?