Due: August 8, 2024

1. Solve the following linear system by the method of elimination:

$$\begin{aligned} x + 2y &= 8 \\ 3x - 4y &= 4 \end{aligned}$$

2. Let

$$A = \begin{bmatrix} 2 & -3 & 5 \\ 6 & -5 & 4 \end{bmatrix}$$

What are the values of a_{12}, a_{22}, a_{23}?

3. Let

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix}$$

If possible, compute the indicated linear combinations:

a) $3 \cdot (2A)$ and $6A$

b) $3A + 2A$ and $5A$

4. Given A defined above in problem 4, compute A^T.

5. For the following matrices, compute $a \cdot b$:

a) $a = \begin{bmatrix} 1 & 2 \end{bmatrix}$ and $b = \begin{bmatrix} 4 \\ -1 \end{bmatrix}$

b) $a = \begin{bmatrix} -3 & -2 \end{bmatrix}$ and $b = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$

c) $a = \begin{bmatrix} 4 & 2 & -1 \end{bmatrix}$ and $b = \begin{bmatrix} 1 \\ 3 \\ 6 \end{bmatrix}$

d) $a = \begin{bmatrix} 1 & 1 & 0 \end{bmatrix}$ and $b = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$

6. Let $a = \begin{bmatrix} -3 & 2 & x \end{bmatrix}$ and $b = \begin{bmatrix} -3 \\ 2 \\ x \end{bmatrix}$. If $a \cdot b = 17$, find x.

7. For the following exercises, let

$$A = \begin{bmatrix} 1 & 2 & -3 \\ 4 & 0 & -2 \end{bmatrix} \qquad B = \begin{bmatrix} 3 & 1 \\ 2 & 4 \\ -1 & 5 \end{bmatrix} \qquad C = \begin{bmatrix} 2 & 3 & 1 \\ 3 & -4 & 5 \\ 1 & -1 & -2 \end{bmatrix}$$

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

If possible, compute:

a) AB
b) BA
c) $CB + D$
d) $AB + DE$
e) $BA + ED$

8. Let

$$A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \\ 0 & 3 \end{bmatrix} \qquad B = \begin{bmatrix} 3 & -1 & 3 \\ 1 & 2 & 4 \end{bmatrix}$$

Compute the following entries of AB:

(a) The $(1, 2)$ entry.
(b) The $(2, 3)$ entry.
(c) The $(3, 1)$ entry.