

**Due: August 10, 2023**

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

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

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

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

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

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

If possible, compute:

a)  $AB$

b)  $BA$

c)  $CB + D$

d)  $AB + DE$

e)  $BA + ED$

8. Let

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

Compute the following entries of  $AB$ :

(a) The  $(1, 2)$  entry.

(b) The  $(2, 3)$  entry.

(c) The  $(3, 1)$  entry.