

Given the following matrices,

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

Find the following or write "NOT POSSIBLE" if it cannot be done.

1) $A + B$ 2) $2A - 4C$ 3) AB 4) BA 5) $AD - 3C$

6) CEA 7) $B(A + 2C)$ 8) $D - E(3A - C)$ 9) $(D - E)(3A - C)$

10) If $\begin{bmatrix} 4 & 3 \\ x & -2 \end{bmatrix} \cdot \begin{bmatrix} 3 & 1 \\ -2 & 1 \end{bmatrix} = \begin{bmatrix} 6 & 7 \\ 19 & 3 \end{bmatrix}$ then find x.

11) If $\begin{bmatrix} -1 & 3 \\ 2 & -4 \end{bmatrix} \cdot \begin{bmatrix} 6 & -3 \\ y & -1 \end{bmatrix} = \begin{bmatrix} x & 0 \\ 4 & -2 \end{bmatrix}$ then find x and y.

12) If $3 \begin{bmatrix} x & 1 \\ -1 & y \end{bmatrix} - 2 \begin{bmatrix} 3 & z \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 9 & 5 \\ -5 & 8 \end{bmatrix}$ then find x, y & z.

13) If $2 \begin{bmatrix} 4 & -1 \\ y & 2 \end{bmatrix} + 3 \begin{bmatrix} z & 2 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} 10 & x \\ 2 & 16 \end{bmatrix}$ then find x, y & z.

14) Given the matrices below, calculate the following:

a) A^{-1} b) B^{-1}

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

15) Given the following system of linear equations

$$\begin{aligned} x + y + z &= 3 \\ x - 2y - 3z &= 4 \\ 5x + y - z &= 2 \end{aligned}$$

- a) Write the system in the form $AX = B$ (All matrices)
b) Solve the system.

16) Given the following system of linear equations

$$\begin{aligned} 2y - z &= 7 \\ 3x + y - z &= 5 \\ 2x &= 1 - 2y \end{aligned}$$

- a) Write the system in the form $AX = B$ (All matrices)
b) Solve the system.

17) Given the following system of linear equations

$$\begin{aligned} x + 2y + 4w &= 6 \\ 3x + z - 4w &= 5 \\ y - 3z - w &= 10 \\ x + y &= z + 7w + 8 \end{aligned}$$

- a) Write the system in the form $AX = B$ (All matrices)
b) Solve the system.

Solutions to Practice 7 (revision 0)

1) Not Possible 2) $\begin{bmatrix} -10 & -2 & 0 \\ 10 & -12 & -2 \end{bmatrix}$ 3) Not Possible 4) $\begin{bmatrix} -7 & -4 & 7 \\ -2 & -3 & 3 \end{bmatrix}$

5) $\begin{bmatrix} 2 & 12 & 12 \\ 10 & -3 & 5 \end{bmatrix}$ 6) $\begin{bmatrix} 16 & 63 & -45 \\ -5 & -40 & 25 \end{bmatrix}$ 7) $\begin{bmatrix} 11 & -24 & 11 \\ 6 & -11 & 5 \end{bmatrix}$

8) $\begin{bmatrix} -9 & -41 & 24 \\ 18 & 24 & -23 \\ -40 & 49 & 9 \end{bmatrix}$ 9) Not Possible 10) $x = 5$ 11) $x = 0, y = 2$

12) $x = 5, y = 4, z = -1$ 13) $x = 4, y = -\frac{1}{2}, z = \frac{2}{3}$

14a) $\begin{bmatrix} \frac{1}{4} & \frac{1}{8} \\ 0 & \frac{1}{2} \end{bmatrix}$ b) $\begin{bmatrix} \frac{3}{13} & \frac{1}{13} & \frac{2}{13} \\ \frac{-9}{13} & \frac{-3}{13} & \frac{7}{13} \\ \frac{-7}{13} & \frac{2}{13} & \frac{4}{13} \end{bmatrix}$ 15a) $\begin{bmatrix} 1 & 1 & 1 \\ 1 & -2 & -3 \\ 5 & 1 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix}$ b) $x = \frac{21}{2}, y = -29, z = \frac{43}{2}$

16a) $\begin{bmatrix} 0 & 2 & -1 \\ 3 & 1 & -1 \\ 2 & 2 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 7 \\ 5 \\ 1 \end{bmatrix}$ b) $x = \frac{-3}{8}, y = \frac{7}{8}, z = \frac{-21}{4}$

17a) $\begin{bmatrix} 1 & 2 & 0 & 4 \\ 3 & 0 & 1 & -4 \\ 0 & 1 & -3 & -1 \\ 1 & 1 & -1 & -7 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \\ w \end{bmatrix} = \begin{bmatrix} 6 \\ 5 \\ 10 \\ 8 \end{bmatrix}$ b) $x = \frac{68}{29}, y = \frac{61}{29}, z = \frac{-75}{29}, w = \frac{-4}{29}$