

16.2.3. Use Cramer's rule to solve the following systems of equations

(a) $X_1 - X_2 + X_3 = 2$
 $X_1 + X_2 - X_3 = 0$
 $-X_1 - X_2 - X_3 = -6$

(b) $X_1 - X_2 = 0$
 $X_1 + 2X_2 + 2X_3 = 0$
 $X_1 + 2X_2 + X_3 = 0$

(c) $X + 2y - 2z = 1$
 $2X - 2y + 5z = 14$
 $2X - 5y + 2z = 1$

16.3.1. Use the definition of determinant to calculate the following.

(a)
$$\begin{vmatrix} 1 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 3 & 0 \\ 0 & 0 & 0 & 4 \end{vmatrix}$$

(b)
$$\begin{vmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ a & b & c & d \end{vmatrix}$$

(c)
$$\begin{vmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & 4 \\ 2 & 3 & 4 & 11 \end{vmatrix}$$

16.4.1. Let $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 4 \\ 5 & 6 \end{pmatrix}$

(a) Calculate AB , BA , $A'B'$, $B'A'$

(b) Show that $|A| = |A'|$

16.4.2. Let $A = \begin{pmatrix} 2 & 1 & 3 \\ 1 & 0 & 1 \\ 1 & 2 & 5 \end{pmatrix}$. White down A' , then show that $|A| = |A'|$

16.6.2. Prove that the inverse of $\begin{pmatrix} 1 & 1 & -3 \\ 2 & 1 & -3 \\ 2 & 2 & 1 \end{pmatrix}$ is $\begin{pmatrix} -1 & 1 & 0 \\ 8/7 & -1 & 3/7 \\ -2/7 & 0 & 1/7 \end{pmatrix}$

16.6.4. Solve the following systems of equations by using matrix inverse.

(a) $2x - 3y = 3$
 $3x - 4y = 5$

(b) $2x - 3y = 8$
 $3x - 4y = 11$

(c) $2x - 3y = 0$
 $3x - 4y = 0$

$AX = B \Leftrightarrow X = A^{-1}B$

16.6.9. Given $B = \begin{pmatrix} 1/2 & 5 \\ 1/4 & -1/2 \end{pmatrix}$, calculate $B^2 + B$ & B^{-1} .

16.7.2. Find the inverse of $A = \begin{pmatrix} -2 & 3 & 2 \\ 6 & 0 & 3 \\ 4 & 1 & -1 \end{pmatrix}$

16.7.3. Let $A = \begin{pmatrix} 0.2 & 0.6 & 0.2 \\ 0 & 0.2 & 0.4 \\ 0.2 & 0.2 & 0 \end{pmatrix}$. Find $(I - A)^{-1}$.

16.8.1. Use Cramer's rule to solve the following systems of equations.

(a) $X + 2y - z = -5$
 $2X - y + z = 6$
 $X - y - 3z = -3$