

TIME: 90 min
M - 107

KING SAUD UNIVERSITY
DEPARTMENT OF MATHEMATICS
(SEMESTER 1, 1437 -1438) FIRST MID-TERM EXAM

FULL MARKS: 50

Question: 1 .(a) Let

$$\begin{aligned}x + y + z &= 0 \\x - 2y + 2z &= 4 \\x + 2y - z &= 2\end{aligned}\quad [10]$$

- (i) Write the above system of linear equations in the form $AX = B$.
(ii) Find A^{-1} using elementary matrix method, and use it to solve the system of equations.

- (b) Find the relationship between a, b and c for which the system of linear equation will be consistent

$$\begin{aligned}3x - 9y + 3z &= a \\x - 2y - z &= b \\5x - 13y + z &= c\end{aligned}\quad [8]$$

Question: 2 . (a) Find A if inverse of $[3A+I]$ is equal to $\begin{bmatrix} 7 & 3 \\ 2 & 1 \end{bmatrix}$ [6]

- (b) Let A and B be 3X3 matrices with $\det A = -10$ and $\det B = 5$.
Find (a) $\det(6A)$, (b) $\det(A^T B^{-1})$ [6]

Question: 3 . Solve the linear system by using Cramer's Rule

$$\begin{aligned}2x_1 + 2x_2 &= 1 \\-2x_1 + x_2 + x_3 &= 0 \\3x_1 + x_3 &= 1\end{aligned}\quad [10]$$

Question: 4 . Suppose the points (2,5), (3,2) and (4,5) lie on the curve

$$y = a + bx + cx^2$$

- i. Find the system of linear equations in a, b and c.
ii. Solve the system by Gauss – Jordan method.
iii. Write the equation of the curve. [10]