

AMERICAN UNIVERSITY OF BEIRUT

MATH204

Quiz I

I-a) Find a 3×2 matrix $A = (a_{ij})_{3 \times 2}$ such that

$$a_{ij} = \begin{cases} 2j - i^2 & \text{if } i = j \\ ij - 2 & \text{if } i \neq j \end{cases}$$

b) Given $A = \begin{pmatrix} 1 & 3 & -4 \\ x & 8 & -4 \\ 0 & -1 & 1 \end{pmatrix}$. Find x if $|A| = 6$.

c) Let $A = \begin{pmatrix} 5 & -4 \\ -2 & 10 \end{pmatrix}$, $B = \begin{pmatrix} 5 & -5 & 10 \\ 2 & -4 & 3 \end{pmatrix}$, $C = \begin{pmatrix} 3 & -2 \\ 4 & 1 \\ -3 & 5 \end{pmatrix}$.

Find

- i) $(C^T + 2B)$
- ii) $(B \cdot C) \cdot I_2 \cdot A$
- iii) $B \cdot A \cdot I$



d) Given the system $AX=B$.

$$\begin{cases} -x_2 + x_3 = 3 \\ -x_1 + x_2 + 2x_3 = 2 \\ x_1 - 2x_3 = -1 \end{cases}$$

Use the Gaussian elimination method to find A^{-1} then solve the system.

e) Given the system

$$\begin{cases} 2x_1 + 3x_2 = 7 \\ -5x_1 - 2x_2 = -1 \end{cases}$$

Use Cramer's rule to find only x_2 .



II- Evaluate the following integrals.

- a) $\int x^2(x^3 + 1)^7 dx$
- b) $\int x^3 e^{-x} dx$
- c) $\int \frac{5x^2 + x + 2}{(x^2 + 1)(3 - x)} dx$

III- Let $y = e^{-2x^3+1} + \sqrt{2x-1}$. Find $y'(x)$.