

First Semester
(without calculators)
Monday 3-3-1445

First Quiz
Time: 20 mins.
240 Math

King Saud University
College of Science
Math. Department

Name:

ID no.:

Q1: If $A = \begin{bmatrix} 2 & 3 \\ -1 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 2 & 0 \end{bmatrix}$, then find the following:

(a) A^{-1} (1 mark).

(b) $\text{tr}(B^T B)$ (2 marks).

(c) A^2 (2 marks).

Solution

Q1:

$$(a) A^{-1} = \frac{1}{-2+3} \begin{bmatrix} -1 & -3 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} -1 & -3 \\ 1 & 2 \end{bmatrix}$$

(b)

$$\text{tr}(B^T B) = \text{tr} \left(\begin{bmatrix} 1 & 2 \\ 0 & 2 \\ 2 & 0 \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 2 & 2 & 0 \end{bmatrix} \right) = \text{tr} \left(\begin{bmatrix} 5 & 4 & 2 \\ 4 & 4 & 0 \\ 2 & 0 & 4 \end{bmatrix} \right) = 5 + 4 + 4 = 13$$

$$(c) A^2 = AA = \begin{bmatrix} 2 & 3 \\ -1 & -1 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ -1 & -1 \end{bmatrix} = \begin{bmatrix} 1 & 3 \\ -1 & -2 \end{bmatrix}$$