

First Semester

First Quiz

King Saud University

(without calculators)

Time: 20 mins.

College of Science

Thursday 23-3-1446

240 Math

Math. Department

Name:

ID no.:

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

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

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

(c) A^2 (2 marks).

Solution

Q1:

$$(a) A^{-1} = \frac{1}{6-4} \begin{bmatrix} 3 & -2 \\ -2 & 2 \end{bmatrix} = \frac{1}{2} \begin{bmatrix} 3 & -2 \\ -2 & 2 \end{bmatrix} = \begin{bmatrix} \frac{3}{2} & -1 \\ -1 & 1 \end{bmatrix}$$

(b)

$$tr(B^T B) = tr \left(\begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix} \begin{bmatrix} 1 & 1 & 2 \end{bmatrix} \right) = tr \left(\begin{bmatrix} 1 & 1 & 2 \\ 1 & 1 & 2 \\ 2 & 2 & 4 \end{bmatrix} \right) = 1 + 1 + 4 = 6$$

$$(c) A^2 = AA = \begin{bmatrix} 2 & 2 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} 2 & 2 \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} 8 & 10 \\ 10 & 13 \end{bmatrix}$$