NAME:
HABIB ID:

LINEAR ALGEBRA

SPRING 2023

QUIZ 1 L1

Max Marks: 10

Time: 10 minutes

Q. 1 Given k is a scalar, state whether the following equation is linear or not, justifying your answer:

$$e^{-k}x_1 - \sqrt[3]{5}\,x_2 + \frac{x_3}{k} = \sin(k)$$

It is linear as all x_1, x_2, x_3 are linear (has power 1) and no multiple of any variable (x_1, x_2, x_3) and no

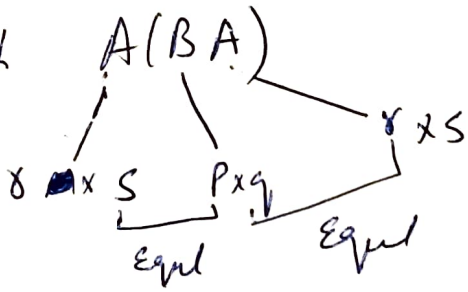
Q. 2 Show that if A is an r x s matrix, and $A(BA)$ is defined, then B is an s x r matrix.

Given A is $r \times s$ matrix

and $A(BA)$ is defined

Let B is $p \times q$ matrix

To defind $A(BA)$



$s = p$, $q = r$

B is $s \times r$ matrix. QED

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Q. 1 State whether the following equation is linear or not, justifying your answer:

$$\pi x_1 - \sqrt[3]{5}\, x_2 = \frac{2}{3} x_3 - 3^{1/5}$$

It is linear as all x_1, x_2, x_3 are linear (power 1) and not multiple of any nor exponential, trig or log of any variable

Q. 2 Show that if A is an m x n matrix, and $A(BA)$ is defined, then B is an n x m matrix.

Given A is $m \times n$ matrix

Let B is $p \times q$ matrix

& A(BA) is defined (Given)

Hence:

$$\underset{m \times n}{A}\ \underset{p \times q}{(B}\ \underset{m \times n}{A)}$$

Equal Equal

$p = n$, $q = m$

B is $n \times m$ matrix QED