Name : SOLUTION **Student ID :**

Question 1 (**1 mark**)

You're given the following linear system :

$$\begin{aligned} 3x_1 - 2x_2 &= -1 \\ 4x_1 + 5x_2 &= 3 \\ 7x_1 + 3x_2 &= 2 \end{aligned}$$

find the augmented matrix.

$$\left(\begin{array}{cc|c} 3 & -2 & -1 \\ 4 & 5 & 3 \\ 7 & 3 & 2 \end{array}\right)$$ **1 mark**

Question 2 (**1 mark**)

Solve the following linear system with the corresponding augmented matrix :

$$\begin{pmatrix} 2 & -1 & 4 \\ -8 & 4 & -1 \end{pmatrix}$$

By reducing the matrix:

$4R_1 + R_2 \rightarrow R_2$

$$\begin{pmatrix} 2 & -1 & 4 \\ 0 & 0 & 15 \end{pmatrix}$$ **0.5 mark**

Back subtituting :

$2x - y = 4$

$0 = 15$

The second equation is contradictory, so the given system has no solution. **0.5 mark**

Question 3 (**1 mark : 0.5 Decision + 0.5 verfication**)

Determine whether the following matrix is in row echelon form, reduced row echelon form or neither (verify):

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

The second row consists entirely of zeros and it is not at the bottom of the matrix which validates a property of row echelon form matrices and if it is not in row echelon form then it can't be at the reduced row echelon form. **0.5 mark**

Neither **0.5 mark**

Question 4 (**1 + 1 marks : 0.5 + 0.5 Decisions , 0.5 + 0.5 verfications**)

Determine if the following statements are true or false (verify):

a) The system:

$\ln(x) + y = 0$

$2x \quad = 0$

is a homogeneos system of linear equations .

False **0.5 mark** . Not linear because the variable x is an argument to a function. **0.5 mark**

b) A consistent linear system has no solution .

False **0.5 mark**

An Inconsistent linear system has no solution **0.5 mark**

OR (Alternative verfication)

A consistent linear system has either infinitely many solutions **0.25 mark** or a unique solution **0.25 mark** (**Alternative**)