TEST 2 – COMPUTATIONAL MATHEMATHICS (SECI1113)

30 MAY 2021 (40 minutes) – session 1

Question 1 **(15 marks)**

Let

$$V = \left\{ \begin{pmatrix} 1 & b \\ c & 1 \end{pmatrix} \middle| \, b, c \in R \right\}$$

Define addition and scalar multiplication as follows.

$$\begin{pmatrix} 1 & \mathrm{b} \\ \mathrm{c} & 1 \end{pmatrix} + \begin{pmatrix} 1 & e \\ f & 1 \end{pmatrix} = \begin{pmatrix} 1 & b+e \\ c+f & 1 \end{pmatrix}$$

$$k \begin{pmatrix} 1 & b \\ c & 1 \end{pmatrix} = \begin{pmatrix} 1 & kb \\ kc & 1 \end{pmatrix}$$

verify the following axioms:

a) $(u + v) + w = u + (v + w)$ (5 marks)

b) $u + (-u) = -u + u = 0$ (5 marks)

c) $c.(u + v) = (c.u) + (c.v)$ (5 marks)

Note: *u, v, w*, are vectors and *c* and *d* are scalars