

06/01/2021
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Analytical Methods (ACHA4000)

Question 1

a) i)
$$\begin{pmatrix} 8 & -1 & 7 \\ -5 & 2 & 5 \\ 3 & 0 & 2 \end{pmatrix} \times \begin{pmatrix} -2 & 8 & 0.5 \\ 2 & 5 & 2 \\ 0 & -9 & 1 \end{pmatrix} = \begin{pmatrix} -18 & -4 & 9 \\ 14 & -75 & 6.5 \\ -6 & 6 & 3.5 \end{pmatrix}$$

ii)
$$\begin{pmatrix} -2 & 8 & 0.5 \\ 2 & 5 & 2 \\ 0 & -9 & 1 \end{pmatrix} \times \begin{pmatrix} 8 & -1 & 7 \\ -5 & 2 & 5 \\ 3 & 0 & 2 \end{pmatrix} = \begin{pmatrix} -54.5 & 18 & 27 \\ -3 & 8 & 43 \\ 48 & -18 & -43 \end{pmatrix}$$

iii)
$$\begin{pmatrix} 8 & -1 & 7 \\ -5 & 2 & 5 \\ 3 & 0 & 2 \end{pmatrix} \times \begin{pmatrix} 2 & 5 \\ -6 & 0 \\ 1 & 12 \end{pmatrix} = \begin{pmatrix} 29 & 124 \\ -17 & 35 \\ 8 & 39 \end{pmatrix}$$

iv)
$$\begin{pmatrix} 2 & 5 \\ -6 & 0 \\ 1 & 12 \end{pmatrix} \times \begin{pmatrix} 8 & -1 & 7 \\ -5 & 2 & 5 \\ 3 & 0 & 2 \end{pmatrix} \neq \text{IMPOSSIBLE!}$$

v)
$$A = \begin{pmatrix} 8 & -1 & 7 \\ -5 & 2 & 5 \\ 3 & 0 & 2 \end{pmatrix} \quad |A| = 8(2 \times 2 - 0 \times 5) - 1(-5 \times 2 - 5 \times 3) + 7(-5 \times 0 - 2 \times 3)$$
$$= 32 - 25 - 42$$
$$= -35$$

vi)
$$B = \begin{pmatrix} -2 & 8 & 0.5 \\ 2 & 5 & 2 \\ 0 & -9 & 1 \end{pmatrix} \quad |B| = -2(5 \times 1 - -9 \times 2) - 8(2 \times 1 - 2 \times 0) + 0.5(2 \times -9 - 5 \times 0)$$
$$= -46 - 16 - 9$$
$$= -71$$