Ass. 5

TOTAL = 9

(i) $x\vec{a} + y\vec{b} + z\vec{c} = \vec{0}$

(a)

OR $x\begin{bmatrix}2\\1\\3\end{bmatrix} + y\begin{bmatrix}3\\0\\-2\end{bmatrix} + z\begin{bmatrix}4\\1\\-7\end{bmatrix} = \begin{bmatrix}0\\0\\0\end{bmatrix}$

OR $\begin{cases} 2x + 3y + 4z = 0 \\ x + z = 0 \\ 3x - 2y - 7z = 0 \end{cases}$ insert $z = -x$

so
$$\begin{aligned} 2x + 3y - 4x &= 0 \\ 3x - 2y + 7x &= 0 \\ 2x &= 3y \end{aligned}$$

so
$$\begin{aligned} 10x &= 2y \\ 0 &= -13y, \text{ so } y = 0, \\ x &= 0 \end{aligned}$$

Conclusion: $x = y = z = 0$ is forced. (4)

No non-trivial solution.

(b) $\vec{a}, \vec{b}, \vec{c}$ are linearly independent, that being how we interpret a forced trivial solution (1)

2. $A = \begin{bmatrix}2 & 3 & 4\\ 3 & 4 & 5\\ 4 & 5 & 6\end{bmatrix}$

(2) $A - A^T = \begin{bmatrix}0 & 0 & 0\\ 0 & 0 & 0\\ 0 & 0 & 0\end{bmatrix}$

3. $B = \begin{bmatrix}-1 & +1 & -1\\ -2 & +2 & -2\end{bmatrix}$ (2)