$$\boxed{\textbf{HW \# 3}}$$

1 **TRUE or FALSE** Questions: <u>Page 108</u>: # **2.2(a)(b), 2.7, 2.9**.

2 **TRUE or FALSE** Questions: <u>Page 122</u>: # **2.11**.

3 Find a set of vectors in $\mathbb{R}^5$ which span the *Solution Space* to $A\mathbf{x} = \mathbf{0}$, if

$$A = \begin{bmatrix} 1 & 0 & 3 & 2 & 1 \\ 2 & 0 & 5 & 3 & 5 \\ 3 & 0 & 7 & 4 & 9 \\ 2 & 0 & 4 & 2 & 8 \end{bmatrix}.$$

4 **TRUE or FALSE** Questions: <u>Page 85</u>: # **1.33, 1.34, 1.35**.

5 Which *subsets* $\mathcal{W}$ of V ($\mathcal{W} \subset V$) are actually **subspaces** of V ? (Justify your answers.)

(a) $\mathcal{W} = \left\{ \begin{bmatrix} x & y & 0 \\ 3 & x & z \end{bmatrix} : x, y, z \in \mathbb{R} \right\}; \quad V = M(2,3)$

(b) $\mathcal{W} = \left\{ \begin{bmatrix} a \\ 0 \\ b \end{bmatrix} : \text{ where } ab = 0 \right\}; \quad V = \mathbb{R}^3$

(c) $\mathcal{W} = \left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} : ad - bc = 0 \right\}; \quad V = M(2,2)$

(d) $\mathcal{W} = \left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} : ad - bc \neq 0 \right\}; \quad V = M(2,2)$

(e) $\mathcal{W} = \left\{ p(x) = a + bx + cx^2 + dx^3 \in \mathcal{P}_3 : p(1) = 0 \text{ and } p(-1) = 0 \right\}; \quad V = \mathcal{P}_3.$

(f) $\mathcal{W} = \left\{ \mathbf{x} \in \mathbb{R}^3 : A\mathbf{x} = \mathbf{0} \right\}$, where A is a fixed 2×3 matrix; $V = \mathbb{R}^3$.