Submitting HW Tips

HW # 4

1 Which *subsets* $\mathcal{W}$ of V ($\mathcal{W} \subset V$) are actually **subspaces** of V?

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

(b) $\mathcal{W} = \left\{ \begin{bmatrix} a & b \\ c & c \end{bmatrix} : a+b+c=0 \right\}; \qquad V = M(2,2)$

(c) $\mathcal{W} = \left\{ p(x) = a + bx^3 + cx^4 : p(-2) = 0 \right\}; \qquad V = \mathcal{P}_4$

2 **TRUE or FALSE** Question: Page 85: # **1.25**.

3 Given the 4×5 matrix $A = \begin{bmatrix} 1 & 0 & 3 & 2 & 1 \\ 2 & 0 & 5 & 3 & 5 \\ 3 & 0 & 7 & 4 & 9 \\ 2 & 0 & 4 & 2 & 8 \end{bmatrix}$, then $A^t = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 0 & 0 & 0 & 0 \\ 3 & 5 & 7 & 4 \\ 2 & 3 & 4 & 2 \\ 1 & 5 & 9 & 8 \end{bmatrix}$ and

$$\mathbf{RREF}\,(A) = \begin{bmatrix} 1 & 0 & 0 & -1 & 10 \\ 0 & 0 & 1 & 1 & -3 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \quad \text{and} \quad \mathbf{RREF}\,(A^t) = \begin{bmatrix} 1 & 0 & -1 & -2 \\ 0 & 1 & 2 & 2 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

Find a spanning set of *linearly independent* vectors for each of the four *Fundamental Subspaces* associated with A:

(a) **Col** (A)

(b) **Row** (A)

(c) **Null** (A)

(d) **Null** (A^t)