

6 (cont.)

(c) If A is a 2×2 matrix and $A^2 = 0$, then $A = 0$.

$$\text{let } A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} \quad A^2 = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$$

$$A^2 = 0 \text{ but } A \neq 0$$

✓ 1.5

ANSWER False ✓

(d) If the $[A|b]$ is a linear system and A is a 2×3 matrix, and A has a row of zeros, then $[A|b]$ has infinitely many solutions.

$$2 \begin{array}{ccc|c} & 3 & & \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{array}$$

$$\text{Parameters} = \text{columns} - \text{rank} \\ = 3 - 1 = 2$$

If the 2×3 matrix has a row of zeros, then the highest rank it can have will be a one. With 3 columns and a rank of one, the number of parameters would be 2, concluding that $[A|b]$ has infinitely many solutions

φ

ANSWER True ✗

4.5