

**Question 1** If a vector space  $V$  has a basis consisting of 5 vectors then for  $\vec{v}_i \in V$ ,

**Multiple Choice:**

- (a)  $\{\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4, \vec{v}_5, \vec{v}_6\}$  is linearly dependent. ✓
- (b)  $\{\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4, \vec{v}_5, \vec{v}_6\}$  is linearly independent.

**Question 2** If a vector space  $V$  has a basis consisting of 5 vectors then for  $\vec{v}_i \in V$ ,

**Multiple Choice:**

- (a)  $\{\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4\}$  spans  $V$ .
- (b)  $\{\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4\}$  does not span  $V$ . ✓

**Question 3** Determine the dimensions of  $\text{Nul } A$  and  $\text{Col } A$ .

$$A = \begin{bmatrix} 2 & 4 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\dim \text{Nul } A = \boxed{1}$$

$$\dim \text{Col } A = \boxed{2}$$

**Question 4** Determine the dimensions of  $\text{Nul } A$  and  $\text{Col } A$ .

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

$$\dim \text{Nul } A = \boxed{0}$$

$$\dim \text{Col } A = \boxed{4}$$

**Question 5** Determine the dimensions of  $\text{Nul } A$  and  $\text{Col } A$ .

$$A = \begin{bmatrix} 5 & 4 & 5 \\ 0 & -1 & 0 \\ 0 & 0 & 3 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\dim \text{Nul } A = \boxed{0}$$

$$\dim \text{Col } A = \boxed{3}$$

**Question 6** Determine the dimensions of  $\text{Nul } A$  and  $\text{Col } A$ .

$$A = \begin{bmatrix} 1 & 3 & -2 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\dim \text{Nul } A = \boxed{2}$$

$$\dim \text{Col } A = \boxed{1}$$

**Question 7** True/False: A plane in  $\mathbf{R}^3$  is a two dimensional subspace of  $\mathbf{R}^3$

**Multiple Choice:**

- (a) True
- (b) False ✓

**Hint:** A plane in  $\mathbf{R}^3$  that doesn't intersect the origin is not a subspace, so couldn't be a subspace of dimension 2.

**Question 8** True/False: If  $\dim V = n$  and  $S$  is a linearly independent set with  $n$  vectors, then  $S$  is a basis for  $V$ .

**Multiple Choice:**

(a) *True* ✓

(b) *False*

