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* $\operatorname{Nul} A$ *and* $\operatorname{Col} A$.

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

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

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

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

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

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

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

Question 5 *Determine the dimensions of* Nul A *and* Col A.

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

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

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

Question 6 *Determine the dimensions of* Nul A *and* Col A.

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

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

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

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 fo* V.

Multiple Choice:

(a) *True* ✓

(b) *False*