

**Question 1** True/False: Any set that is a basis for a vector space  $V$  is also a linearly independent set.

**Multiple Choice:**

- (a) True ✓
- (b) False

**Question 2** True/False: Any linearly independent set that is a subset of  $V$  is a basis for  $V$ .

**Multiple Choice:**

- (a) True
- (b) False ✓

**Question 3** True/False: If the  $\text{Span}\{\vec{b}_1, \dots, \vec{b}_p\}$  is equal to some vector space  $V$ , then  $\{\vec{b}_1, \dots, \vec{b}_p\}$  is a basis for  $V$ .

**Multiple Choice:**

- (a) True
- (b) False ✓

**Question 4** True/False: The pivot columns of  $A$  form a basis for  $\text{Col } A$ .

**Multiple Choice:**

- (a) True ✓
- (b) False

**Question 5** True/False: Suppose the matrix  $A$  below is row equivalent to the matrices  $U_1$  and  $U_2$  below. Which of the following statements is true?

$$A = \begin{bmatrix} 2 & 6 & 4 & 7 \\ -2 & 3 & -4 & 2 \\ -6 & 0 & -12 & -8 \end{bmatrix} \quad U_1 = \begin{bmatrix} 2 & 0 & 4 & 3 \\ 0 & 3 & 0 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix} \quad U_2 = \begin{bmatrix} 1 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

**Multiple Choice:**

- (a)  $\left\{ \begin{bmatrix} 2 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 3 \\ 0 \end{bmatrix}, \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix} \right\}$  forms a basis for  $\text{Col } A$ .
- (b)  $\left\{ \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \right\}$  forms a basis for  $\text{Col } A$ .
- (c)  $\left\{ \begin{bmatrix} 2 \\ -2 \\ -6 \end{bmatrix}, \begin{bmatrix} 6 \\ 3 \\ 0 \end{bmatrix}, \begin{bmatrix} 7 \\ 2 \\ -8 \end{bmatrix} \right\}$  forms a basis for  $\text{Col } A$ . ✓
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