

## Aljabar Linear 1 - 14 Nov - Kode Soal: A

Nama/NIM: \_\_\_\_\_

[4.3.1] What does it mean for a set of vectors to be linearly dependent?

- A. No vector in the set can be expressed as a linear combination of the others.
- B. At least one vector in the set can be expressed as a linear combination of the others.
- C. All vectors in the set are identical.
- D. The set contains only the zero vector.

[4.3.7] In  $R^2$ , two vectors  $\mathbf{u}$  and  $\mathbf{v}$  are linearly independent if, when their initial points are at the origin, they:

- A. Lie on the same line.
- B. Are perpendicular to each other.
- C. Do not lie on the same line.
- D. Both point in the same direction.

[4.3.4] A set with exactly two vectors,  $\{\mathbf{v}_1, \mathbf{v}_2\}$ , is linearly independent if and only if:

- A.  $\mathbf{v}_1 = \mathbf{0}$  or  $\mathbf{v}_2 = \mathbf{0}$ .
- B.  $\mathbf{v}_1$  is a scalar multiple of  $\mathbf{v}_2$ .
- C.  $\mathbf{v}_2$  is a scalar multiple of  $\mathbf{v}_1$ .
- D. Neither vector is a scalar multiple of the other.

[4.4.3] What is the standard basis for  $R^3$ ?

- A.  $(1, 1, 1), (0, 1, 1), (0, 0, 1)$
- B.  $(1, 0, 0), (0, 1, 0), (0, 0, 1)$
- C.  $(1, 0, 0), (0, 0, 0), (0, 0, 1)$
- D.  $(0, 0, 0), (1, 1, 1), (2, 2, 2)$

[4.4.6] Given a basis  $S = \{\mathbf{v}_1, \dots, \mathbf{v}_n\}$  and a vector  $\mathbf{v} = c_1\mathbf{v}_1 + \dots + c_n\mathbf{v}_n$ , what are the scalars  $c_1, \dots, c_n$  called?

- A. Components of  $\mathbf{v}$ .
- B. Magnitudes of  $\mathbf{v}$ .
- C. Coordinates of  $\mathbf{v}$  relative to the basis  $S$ .
- D. Coefficients of  $\mathbf{v}$  in  $V$ .

[4.5.4] What is the defined dimension of the zero vector space  $V = \{\mathbf{0}\}$ ?

- A. 1
- B. Undefined
- C. The number of zero vectors
- D. 0

[4.5.1] What is the dimension of a finite-dimensional vector space  $V$ ?

- A. The number of elements in the vector space itself.
- B. The number of vectors in any basis for  $V$ .
- C. The maximum number of linearly dependent vectors in  $V$ .
- D. The minimum number of vectors required to form a linearly dependent set.

[4.5.7] If  $V$  is a 3-dimensional vector space, and a set  $S$  in  $V$  contains 2 vectors, what can be concluded about  $S$ ?

- A.  $S$  spans  $V$ .
- B.  $S$  is linearly independent.
- C.  $S$  does not span  $V$ .
- D.  $S$  is a basis for  $V$ .

[4.7.4] A system of linear equations  $A\mathbf{x} = \mathbf{b}$  is consistent if and only if:

- A.  $\mathbf{b}$  is the zero vector.
- B.  $\mathbf{b}$  is in the row space of  $A$ .
- C.  $\mathbf{b}$  is in the null space of  $A$ .
- D.  $\mathbf{b}$  is in the column space of  $A$ .

[4.7.10] For the matrix  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ , which of the following is a row vector?

- A.  $\begin{bmatrix} 1 \\ 3 \end{bmatrix}$
- B.  $\begin{bmatrix} 1 & 2 \end{bmatrix}$
- C.  $\begin{bmatrix} 3 & 1 \end{bmatrix}$
- D.  $\begin{bmatrix} 2 \\ 4 \end{bmatrix}$

[4.7.1] For an  $m \times n$  matrix  $A$ , the vectors formed from its rows are called:

- A. Column vectors
- B. Null vectors
- C. Row vectors
- D. Basis vectors

[4.8.6] An  $m \times n$  matrix  $A$  has nullity 0. If  $n = 7$ , what is the rank of  $A$ ?

- A. 0
- B. 7
- C. Undefined
- D. Cannot be determined

[4.7.7] Can elementary row operations change the column space of a matrix?

- A. No, never.
- B. Yes, they always change it.

C. Yes, they can change it, but they do not change the dependence relationships among columns.

D. No, because they only affect rows.

[4.8.9] If an  $m \times n$  matrix  $A$  has rank  $r$ , what is the dimension of the null space of  $A^T$ ?

A.  $n - r$

B.  $m - r$

C.  $r$

D.  $m$

[4.8.3] The rank of a matrix  $A$  can be interpreted as the number of:

A. Rows in  $A$ .

B. Columns in  $A$ .

C. Leading 1's in any row echelon form of  $A$ .

D. Zero rows in any row echelon form of  $A$ .