

[Dashboard](#) / [My courses](#) / [INTRODUCTION TO LINEAR ALGEBRA-Lecture-1201-Meta](#) / [General](#) / [Second Exam](#)

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State Finished

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Grade 25.00 out of 32.00 (78%)

Question 1

Correct

Mark 1.00 out of 1.00

Let $E = [2 + x, 3 - x]$, $F = [1, x]$ be ordered bases for P_2 . The transition matrix from E to F is

Select one:

- a. $\begin{pmatrix} 2 & 1 \\ 3 & -1 \end{pmatrix}$
- b. $\begin{pmatrix} 1 & -1 \\ 3 & 2 \end{pmatrix}$
- c. $\begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$
- d. $\begin{pmatrix} 2 & 3 \\ 1 & -1 \end{pmatrix}$



The correct answer is: $\begin{pmatrix} 2 & 3 \\ 1 & -1 \end{pmatrix}$

Question 2

Incorrect

Mark 0.00 out of 1.00

Let A be a 4×5 -matrix, with $\text{rank}(A) = 3$. Then The rows of A are linearly dependent.

Select one:

- a. True
- b. False ✗

The correct answer is: True

Question 3

Correct

Mark 1.00 out of 1.00

Let V be a vector space of dimension 4 and $W = \{v_1, v_2, v_3, v_4, v_5\}$ a set of nonzero vectors of V , then

Select one:

- a. W is linearly dependent
- b. W is a basis
- c. W is a spanning set
- d. W is linearly independent



The correct answer is: W is linearly dependent

Question 4

Correct

Mark 1.00 out of 1.00

Let $S = \left\{ p(x) = ax^2 + bx + c \in P_3 : \int_0^1 p(x) dx = 0 \right\}$. The dimension of S is.

Select one:

- a. 1
- b. 3
- c. 2 ✓
- d. 4

The correct answer is: 2

Question 5

Correct

Mark 1.00 out of 1.00

The vectors $\{(1, -1, 1)^T, (1, -3, 2)^T, (1, -2, 0)^T\}$ form a basis for \mathbb{R}^3 .

Select one:

- a. False
- b. True ✓

The correct answer is: True

Question 6

Correct

Mark 1.00 out of 1.00

Let $S = \{f \in C[-1, 1] : f \text{ is an odd function}\}$, then S is a subspace of $C[-1, 1]$.

Select one:

- a. True ✓
- b. False

The correct answer is: True

Question 7

Correct

Mark 1.00 out of 1.00

Let A be a 2×4 matrix, and $\text{rank}(A) = 2$, then, the columns of A form a spanning set for \mathbb{R}^2 .

Select one:

- a. False
- b. True ✓

The correct answer is: True

Question 8

Correct

Mark 1.00 out of 1.00

let A be a 4×7 -matrix, if the row echelon form of A has 2 nonzero rows, then $\dim(\text{column space of } A)$ is

Select one:

- a. 7
- b. 2 ✓
- c. 3
- d. 5

The correct answer is: 2

Question 9

Incorrect

Mark 0.00 out of 1.00

If A is a 3×3 -matrix, and $Ax = 0$ has only the zero solution, then $\text{nullity}(A) =$

Select one:

- a. 0
- b. 3
- c. 2
- d. 1

The correct answer is: 0

Question 10

Incorrect

Mark 0.00 out of 1.00

If A is a nonzero 4×2 -matrix and $Ax = 0$ has infinitely many solutions, then $\text{rank}(A) =$

Select one:

- a. 4
- b. 2
- c. 1
- d. 3

The correct answer is: 1

Question 11

Correct

Mark 1.00 out of 1.00

If A is an $n \times n$ singular matrix, then

Select one:

- a. The rows of A are linearly independent
- b. $N(A) = \{0\}$
- c. The columns of A are linearly dependent
- d. $\text{rank}(A) = n$

The correct answer is: The columns of A are linearly dependent

Question 12

Correct

Mark 1.00 out of 1.00

The vectors $\{x^2 + 2x + 1, x - 1, x^2 + x + 1\}$ form a basis for P_3 .

Select one:

- a. False
- b. True

The correct answer is: True

Question 13

Incorrect

Mark 0.00 out of 1.00

Let $S = \left\{ \begin{pmatrix} a + b + 2c \\ a + 2c \\ a + b + 2c \end{pmatrix} : a, b \in \mathbb{R} \right\}$. Then dimension of S equals

Select one:

- a. 1
- b. 3
- c. 2
- d. 0

The correct answer is: 2

Question 14

Correct

Mark 1.00 out of 1.00

dimension of the subspace $S = \text{Span} \left\{ A_1 = \begin{pmatrix} 1 & 2 \\ 1 & 0 \end{pmatrix}, A_2 = \begin{pmatrix} 0 & -1 \\ 1 & 3 \end{pmatrix}, A_3 = \begin{pmatrix} -3 & -8 \\ -1 & 6 \end{pmatrix} \right\}$ is

Select one:

- a. 3
- b. 2
- c. 0
- d. 1

The correct answer is: 2

Question 15

Correct

Mark 1.00 out of 1.00

If A is an $n \times n$ -matrix and for each $b \in \mathbb{R}^n$ the system $Ax = b$ has a unique solution, then

Select one:

- a. A is singular
- b. A is nonsingular
- c. $\text{rank}(A) = n - 1$
- d. $\text{nullity}(A) = 1$

The correct answer is: A is nonsingular

Question 16

Correct

Mark 1.00 out of 1.00

Let A be a 4×3 matrix, and $\text{nullity}(A) = 0$, then

Select one:

- a. The rows of A are linearly independent
- b. the columns of A form a basis for \mathbb{R}^4
- c. $\text{rank}(A) = 1$
- d. The columns of A are linearly independent

The correct answer is: The columns of A are linearly independent

Question 17

Correct

Mark 1.00 out of 1.00

Let A be a 4×6 matrix, and $\text{nullity}(A) = 2$, then the system $Ax = b$ has infinite number of solutions for every $b \in \mathbb{R}^4$.

Select one:

- a. True ✓
- b. False

The correct answer is: True

Question 18

Correct

Mark 1.00 out of 1.00

Let V be a vector space, $v_1, v_2, \dots, v_n \in V$ be linearly independent, and $v \in V$, then the vectors v_1, v_2, \dots, v_n, v are linearly independent.

Select one:

- a. False ✓
- b. True

The correct answer is: False

Question 19

Correct

Mark 1.00 out of 1.00

Let v_1, v_2 be linearly dependent in a vector space V , $V = \text{Span}(v_1, v_2)$, then $\dim(V) = 2$

Select one:

- a. True
- b. False ✓

The correct answer is: False

Question 20

Correct

Mark 1.00 out of 1.00

$\dim(\text{span}(x^2, 3 + x^2, x^2 + 1))$ is

Select one:

- a. 3
- b. 0
- c. 2 ✓
- d. 1

The correct answer is: 2

Question 21

Incorrect

Mark 0.00 out of 1.00

If $T_{n \times n}$ is a transition matrix between two bases for a vector space V , $\dim(V) = n > 0$, then

Select one:

- a. $\text{rank}(T) = 1$ ✗
- b. $\text{nullity}(T) = n$
- c. T is nonsingular
- d. $\det(T) = 1$

The correct answer is: T is nonsingular

Question 22

Incorrect

Mark 0.00 out of 1.00

If A is a 3×2 matrix, then

Select one:

- a. The columns of A are linearly independent
- b. The columns of A are linearly dependent
✘
- c. The rows of A are linearly dependent
- d. $\text{Rank}(A) = 3$

The correct answer is: The rows of A are linearly dependent

Question 23

Correct

Mark 1.00 out of 1.00

The transition matrix from the standard basis $S = \left[e_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}, e_2 = \begin{pmatrix} 0 \\ 1 \end{pmatrix} \right]$ to the ordered basis $U = \left[u_1 = \begin{pmatrix} 2 \\ 3 \end{pmatrix}, u_2 = \begin{pmatrix} 1 \\ 2 \end{pmatrix} \right]$ is

Select one:

- a. $T = \begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix}$
- b. $T = \begin{pmatrix} 2 & -1 \\ -3 & 2 \end{pmatrix}$
✔
- c. $T = \begin{pmatrix} -2 & 1 \\ 3 & -2 \end{pmatrix}$
- d. $T = \begin{pmatrix} 2 & 3 \\ 1 & 2 \end{pmatrix}$

The correct answer is: $T = \begin{pmatrix} 2 & -1 \\ -3 & 2 \end{pmatrix}$

Question 24

Correct

Mark 1.00 out of 1.00

Let $E = [2 + x, 1 - x, x^2 + 1]$ be an ordered basis for P_3 . If $p(x) = 2x^2 + 6x + 5$, then the coordinate vector of $p(x)$ with respect to E is

Select one:

- a. $\begin{pmatrix} 2 \\ -3 \\ 3 \end{pmatrix}$
- b. $\begin{pmatrix} 3 \\ -3 \\ 2 \end{pmatrix}$
✔
- c. $\begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix}$
- d. $\begin{pmatrix} 3 \\ 5 \\ 4 \end{pmatrix}$

The correct answer is: $\begin{pmatrix} 3 \\ -3 \\ 2 \end{pmatrix}$

Question 25

Correct

Mark 1.00 out of 1.00

Let A be a 3×5 matrix, and $\text{nullity}(A) = 3$, then the rows of A are linearly independent

Select one:

- a. False ✓
- b. True

The correct answer is: False

Question 26

Correct

Mark 1.00 out of 1.00

if $\{v_1, v_2, \dots, v_k\}$ is a spanning set for $\mathbb{R}^{3 \times 2}$, then

Select one:

- a. $k = 6$
- b. $k > 6$
- c. $k \geq 6$ ✓
- d. $k \leq 6$

The correct answer is: $k \geq 6$

Question 27

Correct

Mark 1.00 out of 1.00

If $A = \begin{pmatrix} 1 & 2 & -1 & 0 \\ -1 & -2 & 2 & 0 \\ 2 & 4 & 0 & 0 \end{pmatrix}$, then $\text{rank}(A) = 3$.

Select one:

- a. True
- b. False ✓

The correct answer is: False

Question 28

Incorrect

Mark 0.00 out of 1.00

If A is an $m \times n$ -matrix, $m \neq n$, then either the rows or the columns of A are linearly independent

Select one:

- a. False
- b. True ✗

The correct answer is: False

Question 29

Correct

Mark 1.00 out of 1.00

Let $S = \left\{ \begin{pmatrix} x \\ y \end{pmatrix} \in \mathbb{R}^2 : x = -y \right\}$, then S is a subspace of \mathbb{R}^2 .

Select one:

- a. True ✓
- b. False

The correct answer is: True

Question 30

Correct

Mark 1.00 out of 1.00

The coordinate vector of $8 + 6x$ with respect to the basis $[2, 2x]$ is $(4, 3)^T$

Select one:

- a. False
- b. True ✓

The correct answer is: True

Question 31

Correct

Mark 1.00 out of 1.00

If $\{v_1, v_2, v_3, v_4\}$ is a basis for a vector space V , then the set $\{v_1, v_2, v_3\}$ is

Select one:

- a. linearly independent and a spanning set for V .
- b. linearly independent and not a spanning set for V . ✓
- c. linearly dependent and not a spanning set for V .
- d. linearly dependent and a spanning set

The correct answer is: linearly independent and not a spanning set for V .

Question 32

Correct

Mark 1.00 out of 1.00

The nullity of $A = \begin{pmatrix} 1 & 4 & 1 & 2 & 1 \\ 0 & 6 & -1 & 2 & -1 \\ 3 & 10 & 0 & 4 & 1 \end{pmatrix}$ is

Select one:

- a. 2 ✓
- b. 1
- c. 3
- d. 4

The correct answer is: 2

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