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Grade	**25.00** out of 32.00 (**78**%)

Question **1**
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 dependent and not a spanning set for V.
- b. linearly independent and not a spanning set for V. ✔
- c. linearly independent and 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 **2**
Correct
Mark 1.00 out of 1.00

If A is a 3×5-matrix, rows of A are linearly independent, then

Select one:
- a. rank(A) = nullity$(A) + 2$
- b. rank(A) = nullity(A)
- c. rank(A) = nullity$(A) + 3$
- d. rank(A) = nullity$(A) + 1$ ✔

The correct answer is: rank(A) = nullity$(A) + 1$

Question **3**
Correct
Mark 1.00 out of 1.00

If A is a 3×2 matrix, then

Select one:
- a. The columns of A are linearly independent
- b. The rows of A are linearly dependent ✔
- c. Rank$(A) = 3$
- d. The columns of A are linearly dependent

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

Question **4**
Incorrect
Mark 0.00 out of 1.00

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

Select one:
- a. True ✖
- b. False

The correct answer is: False

Question **5**
Correct
Mark 1.00 out of 1.00

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

Select one:
- a. 3
- b. 1
- c. 2 ✔
- d. 4

The correct answer is: 2

Question **6**
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 rank$(A) = 3$.

Select one:
- a. True
- b. False ✔

The correct answer is: False

Question **7**
Correct
Mark 1.00 out of 1.00

The vectors $\{-x+1, 2x^2+3x+3, x^2+x+2\}$ form a basis for P_3.

Select one:
- a. False ✔
- b. True

The correct answer is: False

Question **8**
Correct
Mark 1.00 out of 1.00

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

Select one:
- a. True
- b. False ✔

The correct answer is: False

Question 9
Correct
Mark 1.00 out of 1.00

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

Select one:
- a. 1
- b. 3
- c. 2 ✔
- d. 0

The correct answer is: 2

Question 10
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. rank$(T) = 1$ ✖
- b. det$(T) = 1$
- c. nullity$(T) = n$
- d. T is nonsingular

The correct answer is: T is nonsingular

Question 11
Correct
Mark 1.00 out of 1.00

Let $S = \{f \in C[-1,1] : f(-1) = f(1)\}$, then S is a subspace of $C[-1,1]$.

Select one:
- a. True ✔
- b. False

The correct answer is: True

Question 12
Correct
Mark 1.00 out of 1.00

Let A be a 4×6 matrix, and 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 13
Correct
Mark 1.00 out of 1.00

Let $S = \{\begin{pmatrix} x \\ y \end{pmatrix} \in \mathbb{R}^2 : x = 1 - y\}$, then S is a subspace of $\mathbb{R}^2$.

Select one:
- a. True
- b. False ✔

The correct answer is: False

Question **14**
Correct
Mark 1.00 out of 1.00

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

Select one:
- a. 1
- b. 0
- c. 3
- d. 2 ✔

The correct answer is: 2

Question **15**
Correct
Mark 1.00 out of 1.00

If $v_1, v_2, \cdots, v_n \in V$, dim$(V) = n$ and $v_1, v_2, \cdots, v_n$ are linearly independent, then Span $(v_1, v_2, \cdots, v_n) = V$, .

Select one:
- a. False
- b. True ✔

The correct answer is: True

Question **16**
Correct
Mark 1.00 out of 1.00

let A be a 3×5-matrix, if the row echelon form of A has 1 nonzero row, then dim(column space of A) is

Select one:
- a. 2
- b. 0
- c. 3
- d. 1 ✔

The correct answer is: 1

Question **17**
Incorrect
Mark 0.00 out of 1.00

If $f_1, f_2, \cdots, f_n \in C^{n-1}[a,b]$ and $W[f_1, f_2, \cdots, f_n](x_0) = 0$ for some $x_0 \in [a,b]$, then $f_1, f_2, \cdots, f_n$ are linearly dependent.

Select one:
- a. False
- b. True ✖

The correct answer is: False

Question **18**

Incorrect

Mark 0.00 out of 1.00

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

Select one:

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

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

c. $\begin{pmatrix} -1 & 1 \\ 2 & 3 \end{pmatrix}$ ✖

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

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

Question **19**

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 $p(x) = -3x^2 + x + 5$, then the coordinate vector of $p(x)$ with respect to E is

Select one:

a. $\begin{pmatrix} 3 \\ -3 \\ 2 \end{pmatrix}$

b. $\begin{pmatrix} 3 \\ 5 \\ 4 \end{pmatrix}$

c. $\begin{pmatrix} 2 \\ -3 \\ 3 \end{pmatrix}$

d. $\begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix}$ ✔

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

Question **20**

Incorrect

Mark 0.00 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. $T = \begin{pmatrix} 2 & 3 \\ 1 & 2 \end{pmatrix}$
- c. $T = \begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix}$ ✖
- d. $T = \begin{pmatrix} -2 & 1 \\ 3 & -2 \end{pmatrix}$

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

Question **21**

Correct

Mark 1.00 out of 1.00

The coordinate vector of $\begin{pmatrix} -3 \\ -2 \\ -5 \end{pmatrix}$ with respect to the ordered basis [$\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 3 \\ 4 \end{pmatrix}$] is

Select one:

- a. $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$
- b. $\begin{pmatrix} 3 \\ 2 \\ 5 \end{pmatrix}$
- c. $\begin{pmatrix} 1 \\ -4 \\ 3 \end{pmatrix}$
- d. $\begin{pmatrix} -1 \\ 4 \\ -3 \end{pmatrix}$ ✔

The correct answer is: $\begin{pmatrix} -1 \\ 4 \\ -3 \end{pmatrix}$

Question **22**

Correct

Mark 1.00 out of 1.00

If two nonzero vectors in a vector space V are linearly dependent, then each of them is a scalar multiple of the other.

Select one:

- a. True ✔
- b. False

The correct answer is: True

Question **23**
Incorrect
Mark 0.00 out of 1.00

Which of the following **is not a basis** for the corresponding space

Select one:

a. $\{x+4, 1-x^2, x^2+x+3\}$; P_3 ✖

b. $\{(1,1)^T, (2,-3)^T\}$; $\mathbb{R}^2$

c. $\{5-x, x-1\}$; P_2

d. $\{(-2,-1,-1)^T, (-3,-3,0)^T, (2,0,2)^T\}$; $\mathbb{R}^3$

The correct answer is: $\{(-2,-1,-1)^T, (-3,-3,0)^T, (2,0,2)^T\}$; $\mathbb{R}^3$

Question **24**
Correct
Mark 1.00 out of 1.00

If $v_1, v_2, \cdots, v_k$ are vectors in a vector space V, and Span$(v_1, v_2, \cdots, v_k) =$ Span$(v_1, v_2, \cdots, v_{k-1})$, then v_k can be written as alinear combination of $v_1, v_2, \cdots, v_{k-1}$

Select one:

a. True ✔

b. False

The correct answer is: True

Question **25**
Correct
Mark 1.00 out of 1.00

If A is an $m \times n$-matrix, and columns of A are linearly independent, then

Select one:

a. $m = n$

b. $m = n + 1$

c. $m \leq n$

d. $n \leq m$ ✔

The correct answer is: $n \leq m$

Question **26**
Correct
Mark 1.00 out of 1.00

Let A be a 5×4 matrix, and rank$(A) = 4$

Select one:

a. A has a row of zeros

b. The columns of A are linearly independent ✔

c. nullity$(A) = 1$

d. The rows of A are linearly independent

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

Question **27**
Incorrect
Mark 0.00 out of 1.00

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

Select one:
- a. 2 ✗
- b. 4
- c. 3
- d. 1

The correct answer is: 1

Question **28**
Correct
Mark 1.00 out of 1.00

If A is a 4×3 matrix with rank$(A) = 3$, then the homogeneous system $Ax = 0$ has a nontrivial solution.

Select one:
- a. False ✓
- b. True

The correct answer is: False

Question **29**
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(column space of A) is

Select one:
- a. 7
- b. 5
- c. 2 ✓
- d. 3

The correct answer is: 2

Question **30**
Correct
Mark 1.00 out of 1.00

The functions $\sin x, \cos x, \sin(2x)$ in $C^2[0, 2\pi]$ are

Select one:
- a. linearly dependent
- b. linearly independent ✓

The correct answer is: linearly independent

Question **31**
Correct
Mark 1.00 out of 1.00

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

Select one:
- a. 1
- b. 3
- c. 2
- d. 0 ✓

The correct answer is: 0

Question **32**

Correct

Mark 1.00 out of 1.00

The vectors $\{(1,-1,-4)^T, (1,-1,1)^T, (1,-1,2)^T\}$ form a basis for $\mathbb{R}^3$.

Select one:

- a. False ✔
- b. True

The correct answer is: False

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