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Grade	**29.00** out of 32.00 (**91**%)

Question **1**

Incorrect

Mark 0.00 out of 1.00

Every spanning set for $\mathbb{R}^3$ contains at least 3 vectors.

Select one:

- a. False ✖
- b. True

The correct answer is: True

Question **2**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. True
- b. False ✔

The correct answer is: False

Question **3**

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

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

Question **4**

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 $[p(x)]_E = \begin{pmatrix} 1 \\ -1 \\ 3 \end{pmatrix}$, then

Select one:

a. $p(x) = 3x^2 + x - 3$

b. $p(x) = 3x^2 + 2x + 4$ ✔

c. $p(x) = x^2 - x + 3$

d. $p(x) = 3x^2 + 2x + 5$

The correct answer is: $p(x) = 3x^2 + 2x + 4$

Question **5**

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. 2

c. 0 ✔

d. 3

The correct answer is: 0

Question **6**

Correct

Mark 1.00 out of 1.00

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

Select one:

a. 0

b. 1

c. 3

d. 2 ✔

The correct answer is: 2

Question **7**

Incorrect

Mark 0.00 out of 1.00

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

Select one:

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

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

c. $\{x+4, 1-x^2, x^2+x+3\}; P_3$ ✖

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 **8**

Correct

Mark 1.00 out of 1.00

If V is a vector space of dimension n, then any subset from V that has less than n vectors is not a spanning set for V.

Select one:

- a. True ✔
- b. False

The correct answer is: True

Question **9**

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. True ✔
- b. False

The correct answer is: True

Question **10**

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 nonsingular ✔
- b. nullity$(A) = 1$
- c. rank$(A) = n - 1$
- d. A is singular

The correct answer is: A is nonsingular

Question **11**

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

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

Question 12
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$(A)+1$ ✔
- d. rank$(A)=$ nullity$(A)+3$

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

Question 13
Correct
Mark 1.00 out of 1.00

If A is a 4×6 matrix, then nullity of $A \geq 2$.

Select one:
- a. True ✔
- b. False

The correct answer is: True

Question 14
Correct
Mark 1.00 out of 1.00

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

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

The correct answer is: 3

Question 15
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 a basis
- b. W is a spanning set
- c. W is linearly independent
- d. W is linearly dependent ✔

The correct answer is: W is linearly dependent

Question 16
Incorrect
Mark 0.00 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

The correct answer is: True

Question **17**
Correct
Mark 1.00 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 **18**
Correct
Mark 1.00 out of 1.00

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

Select one:
- a. linearly independent.
- b. linearly dependent
- c. form a spanning set for $C^{n-1}[a, b]$

The correct answer is: linearly independent.

Question **19**
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. 3
- b. 5
- c. 2
- d. 7

The correct answer is: 2

Question **20**
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. $\begin{pmatrix} 2 \\ -3 \\ 3 \end{pmatrix}$
- b. $\begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix}$
- c. $\begin{pmatrix} 3 \\ 5 \\ 4 \end{pmatrix}$
- d. $\begin{pmatrix} 3 \\ -3 \\ 2 \end{pmatrix}$

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

Question **21**

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 **22**

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. False ✔
- b. True

The correct answer is: False

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 $U = \left[u_1 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}, u_2 = \begin{pmatrix} 3 \\ 7 \end{pmatrix} \right]$ is

Select one:

- a. $T = \begin{pmatrix} 1 & -3 \\ -2 & 7 \end{pmatrix}$
- b. $T = \begin{pmatrix} -7 & 3 \\ 2 & -1 \end{pmatrix}$
- c. $T = \begin{pmatrix} 7 & -3 \\ -2 & 1 \end{pmatrix}$ ✔
- d. $T = \begin{pmatrix} 1 & 3 \\ 2 & 7 \end{pmatrix}$

The correct answer is: $T = \begin{pmatrix} 7 & -3 \\ -2 & 1 \end{pmatrix}$

Question **24**

Correct

Mark 1.00 out of 1.00

Let V be a vector space, $\{v_1, v_2, \ldots v_n\}$ a spanning set for V, and $v \in V$, then the vectors $\{v_1, v_2, \ldots v_n, v\}$ form a spanning set for V.

Select one:

- a. False
- b. True ✔

The correct answer is: True

Question **25**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. 3
- b. 0
- c. 1
- d. 2 ✔

The correct answer is: 2

Question **26**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. False ✔
- b. True

The correct answer is: False

Question **27**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. False ✔
- b. True

The correct answer is: False

Question **28**

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 **29**

Correct

Mark 1.00 out of 1.00

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

Select one:

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

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

Question **30**

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. 1
- b. 2 ✔
- c. 0
- d. 3

The correct answer is: 2

Question **31**

Correct

Mark 1.00 out of 1.00

If the columns of $A_{n \times n}$ are linearly independent and $b \in \mathbb{R}^n$, then the system $Ax = b$ is inconsistent.

Select one:

- a. False ✔
- b. True

The correct answer is: False

Question **32**

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