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Time taken 1 hour 14 mins
Grade **22.00** out of 32.00 (**69**%)

Question **1**
Correct
Mark 1.00 out of 1.00

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

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

The correct answer is: 2

Question **2**
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. 0 ✔
- b. 2
- c. 3
- d. 1

The correct answer is: 0

Question **3**
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. 2 ✔
- b. 3
- c. 0
- d. 1

The correct answer is: 2

Question **4**

Incorrect

Mark 0.00 out of 1.00

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

Select one:

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

The correct answer is: $k \geq 6$

Question **5**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. False
- b. True ✔

The correct answer is: True

Question **6**

Correct

Mark 1.00 out of 1.00

If $f_1, f_2, \cdots, f_n \in C^{n-1}[a, b]$ and $W[f_1, f_2, \cdots, f_n](x_0) = 0$ 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 **7**

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. 3
- b. 2 ✖
- c. 1
- d. 4

The correct answer is: 1

Question **8**

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. True
- b. False ✔

The correct answer is: False

Question **9**

Incorrect

Mark 0.00 out of 1.00

If $\{v_1, v_2, v_3, v_4\}$ forms a spanning set for a vector space V, $\dim(V) = 3$, v_4 can be written as a linear combination of v_1, v_2, v_3, then

Select one:

- a. $\{v_1, v_2, v_3\}$ are linearly dependent ✖
- b. $\{v_1, v_2, v_3\}$ is a basis for V
- c. v_1 can be written as a linear combination of v_2, v_3, v_4
- d. $\{v_1, v_2, v_3\}$ do not form a spanning set for V

The correct answer is: $\{v_1, v_2, v_3\}$ is a basis for V

Question **10**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. False
- b. True ✔

The correct answer is: True

Question **11**

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 **12**

Incorrect

Mark 0.00 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 **13**

Incorrect

Mark 0.00 out of 1.00

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

Select one:

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

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

Question **14**

Correct

Mark 1.00 out of 1.00

Let A be a 4×3-matrix with nullity$(A) = 0$. Then rank$(A) = 1$

Select one:

- a. False ✔
- b. True

The correct answer is: False

Question **15**

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. 2 ✔
- b. 3
- c. 0
- d. 1

The correct answer is: 2

Question **16**

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

Select one:

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

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

Question **17**

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. 0
- b. 2
- c. 1
- d. 3 ✔

The correct answer is: 3

Question **18**

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. True
- b. False ✔

The correct answer is: False

Question **19**

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 independent ✔
- b. linearly dependent

The correct answer is: linearly independent

Question **20**

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. False ✔
- b. True

The correct answer is: False

Question **21**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. False
- b. True ✔

The correct answer is: True

Question **22**

Correct

Mark 1.00 out of 1.00

If A is a 3×5 matrix, then

Select one:

- a. The columns of A are linearly independent
- b. The rows of A are linearly dependent
- c. $\text{nullity}(A) \geq 2$ ✔
- d. $Rank(A) = 2$

The correct answer is: $\text{nullity}(A) \geq 2$

Question **23**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. 2 ✔
- b. 4
- c. 1
- d. 3

The correct answer is: 2

Question **24**

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

The correct answer is: linearly independent.

Question **25**

Incorrect

Mark 0.00 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. 0
- b. 2
- c. 3 ✖
- d. 1

The correct answer is: 1

Question **26**

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

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

Question **27**

Correct

Mark 1.00 out of 1.00

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

Select one:

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

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

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

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

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

Question **28**

Correct

Mark 1.00 out of 1.00

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

Select one:

a. The columns of A are linearly independent ✔

b. The rows 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 **29**

Incorrect

Mark 0.00 out of 1.00

Let A be a 3×5 matrix, and nullity$(A)=2$, then the columns of A form a aspanning set for $\mathbb{R}^3$

Select one:

a. True

b. False ✖

The correct answer is: True

Question **30**

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$(A)+3$

b. rank$(A)=$ nullity(A)

c. rank$(A)=$ nullity$(A)+2$

d. rank$(A)=$ nullity$(A)+1$ ✔

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

Do

Question **31**

Incorrect

Mark 0.00 out of 1.00

If V is a vector space of dimension n, then any subset of V which has more than n vectors is a spanning set for V.

Select one:

- a. False
- b. True ✖

The correct answer is: False

Question **32**

Incorrect

Mark 0.00 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. False ✖
- b. True

The correct answer is: True

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