

**Started on** Sunday, 10 January 2021, 9:55 AM

**State** Finished

**Completed on** Sunday, 10 January 2021, 11:09 AM

**Time taken** 1 hour 14 mins

**Grade** 19.00 out of 32.00 (59%)

**Question 1**

Incorrect

Mark 0.00 out of 1.00

If  $A$  is a  $3 \times 2$  matrix, then

Select one:

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

✘

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

**Question 2**

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

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

Select one:

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

✘

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

**Question 3**

Incorrect

Mark 0.00 out of 1.00

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

Select one:

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

✘

The correct answer is: 3

**Question 4**

Correct

Mark 1.00 out of 1.00

The nullity 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. 1
- b. 3 ✓
- c. 0
- d. 2

The correct answer is: 3

**Question 5**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. True ✓
- b. False

The correct answer is: True

**Question 6**

Incorrect

Mark 0.00 out of 1.00

If  $A$  is a  $3 \times 5$ -matrix, rows of  $A$  are linearly independent, then

Select one:

- a.  $\text{rank}(A) = \text{nullity}(A) + 1$
- b.  $\text{rank}(A) = \text{nullity}(A)$
- c.  $\text{rank}(A) = \text{nullity}(A) + 2$  ✗
- d.  $\text{rank}(A) = \text{nullity}(A) + 3$

The correct answer is:  $\text{rank}(A) = \text{nullity}(A) + 1$ **Question 7**

Correct

Mark 1.00 out of 1.00

Let  $A$  be a  $3 \times 5$ -matrix, if the row echelon form of  $A$  has 1 nonzero row, then  $\dim(\text{column space of } A)$  is

Select one:

- a. 2
- b. 3
- c. 1 ✓
- d. 0

The correct answer is: 1

Question 8

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

The correct answer is:  $T$  is nonsingular

Question 9

Incorrect

Mark 0.00 out of 1.00

If  $S$  is a subset of a vector space  $V$ , and  $0 \in S$ , then  $S$  is a subspace of  $V$ .

Select one:

- a. True ✘
- b. False

The correct answer is: False

Question 10

Incorrect

Mark 0.00 out of 1.00

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

Select one:

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

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

Question 11

Correct

Mark 1.00 out of 1.00

Let  $A$  be a  $5 \times 4$  matrix, and  $\text{rank}(A) = 4$

Select one:

- a. The rows of  $A$  are linearly independent
- b.  $A$  has a row of zeros
- c. nullity( $A$ ) = 1
- d. The columns of  $A$  are linearly independent  
✔

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

**Question 12**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. True
- b. False ✓

The correct answer is: False

**Question 13**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a.  $\{(-2, -1, -1)^T, (-3, -3, 0)^T, (2, 0, 2)^T\}; \mathbb{R}^3$  ✓
- b.  $\{x + 4, 1 - x^2, x^2 + x + 3\}; P_3$
- c.  $\{5 - x, x - 1\}; P_2$
- d.  $\{(1, 1)^T, (2, -3)^T\}; \mathbb{R}^2$

The correct answer is:  $\{(-2, -1, -1)^T, (-3, -3, 0)^T, (2, 0, 2)^T\}; \mathbb{R}^3$ **Question 14**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. True ✓
- b. False

The correct answer is: True

**Question 15**

Incorrect

Mark 0.00 out of 1.00

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

Select one:

- a. False ✗
- b. True

The correct answer is: True

**Question 16**

Correct

Mark 1.00 out of 1.00

If  $A, B$  are two row equivalent  $m \times n$ -matrices, then  $\text{rank}(A) = \text{rank}(B)$

Select one:

- a. True ✓
- b. False

The correct answer is: True

**Question 17**

Correct

Mark 1.00 out of 1.00

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

Select one:

- a. 0 ✓
- b. 2
- c. 3
- d. 1

The correct answer is: 0

**Question 18**

Correct

Mark 1.00 out of 1.00

If  $A$  is a nonzero  $3 \times 2$  matrix such that  $Ax = 0$  has infinite number of solutions, then  $\text{rank}(A) = 1$ .

Select one:

- a. False
- b. True ✓

The correct answer is: True

**Question 19**

Correct

Mark 1.00 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. 0
- c. 3
- d. 2 ✓

The correct answer is: 2

**Question 20**

Correct

Mark 1.00 out of 1.00

If  $A$  is an  $n \times n$  nonsingular matrix, then  $\text{nullity}(A) = 0$

Select one:

- a. False
- b. True ✓

The correct answer is: True

**Question 21**

Incorrect

Mark 0.00 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 22**

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



The correct answer is: 2

**Question 23**

Correct

Mark 1.00 out of 1.00

let  $A$  be a  $4 \times 7$ -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. 3
- c. 2
- d. 5



The correct answer is: 2

**Question 24**

Incorrect

Mark 0.00 out of 1.00

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

Select one:

- a. True
- b. False



The correct answer is: True

**Question 25**

Correct

Mark 1.00 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.  $\begin{pmatrix} 1 & 2 \\ -1 & 3 \end{pmatrix}$
- b.  $\begin{pmatrix} -1 & 1 \\ 3 & 2 \end{pmatrix}$
- 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 26**

Incorrect

Mark 0.00 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 27**

Incorrect

Mark 0.00 out of 1.00

Let  $E = [2 + x, 1 - x, x^2 + 1]$  be an ordered basis for  $P_3$ . If  $p(x) = 3x^2 - 3x$ , then the coordinate vector of  $p(x)$  with respect to  $E$  is

Select one:

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

The correct answer is:  $\begin{pmatrix} -2 \\ 1 \\ 3 \end{pmatrix}$ **Question 28**

Correct

Mark 1.00 out of 1.00

If  $A$  is an  $m \times n$ -matrix, and columns of  $A$  form a spanning set for  $\mathbb{R}^m$ , then

Select one:

- a.  $n \leq m$
- b.  $m = n$
- c.  $m = n + 1$
- d.  $m \leq n$  ✔

The correct answer is:  $m \leq n$ **Question 29**

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. False
- b. True ✔

The correct answer is: True

**Question 30**

Correct

Mark 1.00 out of 1.00

If  $A$  is a  $4 \times 3$  matrix such that  $N(A) = \{0\}$ , and  $b$  can be written as a linear combination of the columns of  $A$ , then

Select one:

- a. The system  $Ax = b$  has exactly one solution ✓
- b. The system  $Ax = b$  has infinitely many solutions
- c. The system  $Ax = b$  is inconsistent
- d. The system  $Ax = b$  has exactly two solutions

The correct answer is: The system  $Ax = b$  has exactly one solution

**Question 31**

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. False
- b. True ✗

The correct answer is: False

**Question 32**

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

Announcements ►

[Data retention summary](#)