

Question 1

Incorrect

Mark 0.00 out of
1.00

If A is a 4×3 -matrix, $b \in \mathbb{R}^4$, and the system $Ax = b$ is consistent, then $Ax = b$ has a unique solution.

Select one:

- a. False
- b. True ✘

The correct answer is: False

Question 2

Incorrect

Mark 0.00 out of
1.00

If A is a singular matrix, then the system $Ax = b$ has infinite number of solutions

Select one:

- a. True ✘
- b. False

The correct answer is: False

(α)

Question 4

Correct

Mark 1.00 out of 1.00

If $(A|b) = \left(\begin{array}{ccc|c} 1 & 2 & -1 & 0 \\ 2 & 3 & 1 & -1 \\ 1 & 1 & \alpha & \beta \end{array} \right)$, then the system has infinite number of solutions if

Select one:

- a. $\alpha \neq 2$ and β any number
- b. $\alpha = 2$ and $\beta \neq -1$
- c. $\alpha = 2$ and $\beta = -1$
- d. $\alpha \neq 2$ and $\beta \neq -1$

The correct answer is: $\alpha = 2$ and $\beta = -1$

Question 5

Correct

Mark 1.00 out of 1.00

Let $A = \begin{pmatrix} 1 & -1 & 1 \\ 3 & -2 & 2 \\ -2 & 1 & 3 \end{pmatrix}$, then $\det(A) =$

Select one:

- a. 4
- b. 0
- c. 8
- d. 1

The correct answer is: 4

Question 6

Correct

Mark 1.00 out of 1.00

If $(A|b) = \left(\begin{array}{ccc|c} 1 & 1 & 2 & 4 \\ 2 & -1 & 2 & 6 \\ 1 & 1 & 2 & 5 \end{array} \right)$, then the system $Ax = b$ is inconsistent

Select one:

- a. False
- b. True

The correct answer is: True

Question 7

Incorrect

Mark 0.00 out of 1.00

If a matrix B is obtained from A by multiplying a row of A by a real number c , then $|A| = c|B|$.

Select one:

- a. False
- b. True

The correct answer is: False

Question 8

Incorrect

Mark 0.00 out of 1.00

In the square linear system $Ax = b$, if A is singular and b is not a linear combination of the columns of A then the system

Select one:

- a. can not tell
- b. has a unique solution
- c. has infinitely many solutions ✘
- d. has no solution

The correct answer is: has no solution

Question 9

Correct

Mark 1.00 out of 1.00

If E is an elementary matrix of type III, then E^T is

Select one:

- a. not an elementary matrix
- b. an elementary matrix of type III ✔
- c. an elementary matrix of type I
- d. an elementary matrix of type II

The correct answer is: an elementary matrix of type III

Question 10

Correct

Mark 1.00 out of 1.00

If $AB = 0$, where A and B are $n \times n$ nonzero matrices. Then

Select one:

- a. both A, B are nonsingular.
- b. both A, B are singular. ✔
- c. either A or B is singular
- d. either $A = 0$ or $B = 0$

The correct answer is: both A, B are singular.**Question 11**

Correct

Mark 1.00 out of 1.00

If A, B are $n \times n$ -skew-symmetric matrices (A is skew symmetric if $A^T = -A$), then $AB + BA$ is symmetric

Select one:

- a. False
- b. True ✔

The correct answer is: True

Question 12

Correct

Mark 1.00 out of 1.00

If A is a 3×3 matrix such that $\det(A) = 2$, then $\det(3A) = 6$

Select one:

- a. True
- b. False ✔

The correct answer is: False

Question 13

Correct

Mark 1.00 out of 1.00

The adjoint of the matrix $\begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix}$ is

Select one:

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

The correct answer is: $\begin{pmatrix} 3 & -5 \\ -1 & 2 \end{pmatrix}$

Question 14

Correct

Mark 1.00 out of 1.00

Let $(1, 2, 0)^T$ and $(2, 1, 1)^T$ be the first two columns of a 3×3 matrix A and $(1, 1, 1)^T$ be a solution of the system $Ax = (2, 1, 3)^T$. Then the third column of the matrix A is

Select one:

- a. $(1, 1, 0)^T$.
- b. $(-1, -2, 2)^T$.
- c. $(4, -1, 1)^T$.
- d. $(-1, -1, 2)^T$.

The correct answer is: $(-1, -2, 2)^T$.

Question 15

Correct

Mark 1.00 out of 1.00

$(0, 0, 0)^T$ is a linear combination of the vectors $(1, 2, 3)^T$, $(1, 4, 1)^T$, $(2, 3, 1)^T$

Select one:

- a. True ✓
- b. False

The correct answer is: True

Question 16

Correct

Mark 1.00 out of 1.00

Let A be a 4×4 -matrix such that $A \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$, then

Select one:

- a. There are elementary matrices E_1, E_2, \dots, E_k such that $A = E_1 E_2 \dots E_k$
- b. A is singular. ✓
- c. A is the zero matrix
- d. The system $Ax = 0$ has only one solution

The correct answer is: A is singular.

Question 17

Incorrect

Mark 0.00 out of 1.00

Let A be a 3×4 matrix which has a row of zeros, and let B be a 4×4 matrix, then AB has a row of zeros.

Select one:

- a. False ✘
- b. True

The correct answer is: True

Question 18

Incorrect

Mark 0.00 out of 1.00

If A is a 4×3 matrix such that $Ax = 0$ has only the zero solution, and $b = \begin{pmatrix} 1 \\ 3 \\ 2 \\ 0 \end{pmatrix}$, then the system $Ax = b$

Select one:

- a. is either inconsistent or has an infinite number of solutions
- b. is inconsistent
- c. is either inconsistent or has one solution
- d. has exactly one solution ✘

The correct answer is: is either inconsistent or has one solution

Question 19

Correct

Mark 1.00 out of 1.00

If x_0 is a solution of the nonhomogeneous system $Ax = b$ and x_1 is a solution of the homogeneous system $Ax = 0$. Then $x_1 + x_0$ is a solution of

Select one:

- a. the system $Ax = 0$
- b. the system $Ax = 2b$
- c. the system $Ax = Ab$
- d. the system $Ax = b$ ✓

The correct answer is: the system $Ax = b$ **Question 20**

Correct

Mark 1.00 out of 1.00

If A, B are two square nonzero matrices and $AB = 0$ then both A and B are singular

Select one:

- a. False
- b. True ✓

The correct answer is: True

Question 21

Incorrect

Mark 0.00 out of 1.00

If A is a 3×3 matrix with $\det(A) = -1$. Then $\det(\text{adj}(A)) =$

Select one:

- a. -1 .
x
- b. 3 .
- c. -3 .
- d. 1 .

The correct answer is: 1 .

Question 22

Correct

Mark 1.00 out of 1.00

If A is a 3×5 matrix, then the system $Ax = 0$

Select one:

- a. has no solution.
- b. has only the zero solution
- c. has infinitely many solutions **✓**
- d. is inconsistent

The correct answer is: has infinitely many solutions

Question 23

Correct

Mark 1.00 out of 1.00

If A is a nonsingular $n \times n$ matrix, $b \in \mathbb{R}^n$, then

Select one:

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

The correct answer is: The system $Ax = b$ has a unique solution

Question 24

Correct

Mark 1.00 out of 1.00

If A, B are $n \times n$ symmetric matrices then AB is symmetric.

Select one:

- a. False **✓**
- b. True

The correct answer is: False

Question 25

Correct

Mark 1.00 out of 1.00

If A is a 2×3 -matrix, and $b = a_2$ (second column of A), then a solution to the system $Ax = b$ is

Select one:

- a. $x = \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \end{pmatrix}$
- b. $x = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$
- c. $x = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$
- d. $x = \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}$

The correct answer is: $x = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$

Question 26

Incorrect

Mark 0.00 out of 1.00

If A and B are $n \times n$ matrices such that $Ax \neq Bx$ for all nonzero $x \in \mathbb{R}^n$. Then

Select one:

- a. $A - B$ is nonsingular.
- b. A and B are nonsingular.
- c. $A - B$ is singular.
- d. A and B are singular.

The correct answer is: $A - B$ is nonsingular.

Question 27

Correct

Mark 1.00 out of 1.00

If A is a nonsingular $n \times n$ matrix, then

Select one:

- a. There are elementary matrices E_1, E_2, \dots, E_k such that $A = E_1 E_2 \cdots E_k$.
- b. There is a singular matrix C such that $A = CI$.
- c. The system $Ax = 0$ has a nontrivial (nonzero) solution.
- d. $\det(A) = 1$

The correct answer is: There are elementary matrices E_1, E_2, \dots, E_k such that $A = E_1 E_2 \cdots E_k$.

Question 28

Correct

Mark 1.00 out of 1.00

Any elementary matrix is nonsingular

Select one:

- a. False
- b. True ✓

The correct answer is: True

Question 29

Correct

Mark 1.00 out of 1.00

If A is singular and B is nonsingular $n \times n$ -matrices, then AB is

Select one:

- a. singular ✓
- b. may or may not be singular
- c. nonsingular

The correct answer is: singular

Question 30

Correct

Mark 1.00 out of 1.00

In the $n \times n$ -linear system $Ax = b$, if A is singular and b is a linear combination of the columns of A then the system has

Select one:

- a. exactly two solutions
- b. no solution
- c. a unique solution
- d. infinitely many solutions ✓

The correct answer is: infinitely many solutions

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