Rank of a matrix A is equal to

- [ ] the row rank of the matrix A.
- [ ] the column rank of the matrix A.
- [ ] the nullity of the matrix A.
- [ ] the number of dependent variables in the system of equations $Ax = 0$.
- [ ] the number of independent variables in the system of equations $Ax = 0$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

the row rank of the matrix A.
the column rank of the matrix A.
the number of dependent variables in the system of equations $Ax = 0$.

Let nullity of the matrix $A_{3\times5}$ be 2. Find the rank of the matrix $A_{3\times5}$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 3

1 point

Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 2 & 4 & 6 \end{bmatrix}$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 2

1 point

If A is an $m \times n$ matrix, then which of the following statements is true?

1 point

- $rank(A) + nullity(A) = m$
- $rank(A) + nullity(A) = n$
- $rank(A) + nullity(A) = mn$
- $rank(A) + nullity(A) = max\{m, n\}$
- $rank(A) + nullity(A) = min\{m, n\}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$rank(A) + nullity(A) = n$

Which of the following is true for a homogeneous system of linear equations $Ax = 0$?

1 point

- [ ] It may have no solution.
- [ ] It can have infinitely many solutions.
- [ ] It can have a unique solution.
- [ ] Whenever it has a non-trivial(non zero) solution, it must have infinitely many solutions

No, the answer is incorrect.

Score: 0

Accepted Answers:

It can have infinitely many solutions.
It can have a unique solution.
Whenever it has a non-trivial(non zero) solution, it must have infinitely many solutions

Which of the following options are correct for a square matrix A of order $n \times n$, where n is any natural number? ***1 point***

- [ ] If the determinant is non-zero, then the nullity of A must be 0.
- [ ] If the determinant is non-zero, then the nullity of A may be non-zero.
- [ ] If the nullity of A is non-zero, then the determinant of A must be 0.
- [ ] If the nullity of A is non-zero, then the determinant of A may be non-zero.

No, the answer is incorrect.

Score: 0

Accepted Answers:

If the determinant is non-zero, then the nullity of A must be 0.
If the nullity of A is non-zero, then the determinant of A must be 0.

Choose the set of correct statements. ***1 point***

- [ ] If nullity of a 3×3 matrix is c for some natural number c, $0 \leq c \leq 3$, then the nullity of $-A$ will also be c.
- [ ] $nullity(A+B) = nullity(A) + nullity(B)$
- [ ] Nullity of the zero matrix of order $n \times n$, is n.
- [ ] Nullity of the zero matrix of order $n \times n$, is 0.
- [ ] There exist square matrices A and B of order $n \times n$, such that nullity of both A and B is 0, but the nullity of $A+B$ is n.

No, the answer is incorrect.

Score: 0

Accepted Answers:

If nullity of a 3×3 matrix is c for some natural number c, $0 \leq c \leq 3$, then the nullity of $-A$ will also be c.
Nullity of the zero matrix of order $n \times n$, is n.

There exist square matrices A and B of order $n \times n$, such that nullity of both A and B is 0, but the nullity of $A + B$ is n.

The rank of an $n \times n$ matrix all of whose entries are equal to 1 is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 1

1 point

If A is a 3×4 matrix, then which of the following options are true?

1 point

- [ ] rank(A) must be less than or equal to 3.
- [ ] nullity(A) must be greater than or equal to 1.
- [ ] If A has 2 columns which are non-zero and not multiples of each other, while the remaining columns are linear combinations of these 2 columns, then $nullity(A) = 2$.
- [ ] If A has 2 columns which are non-zero and not multiples of each other, while the remaining columns are linear combinations of these 2 columns, then $nullity(A) = 1$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

rank(A) must be less than or equal to 3.
nullity(A) must be greater than or equal to 1.
If A has 2 columns which are non-zero and not multiples of each other, while the remaining columns are linear combinations of these 2 columns, then $nullity(A) = 2$.

Level 2

1 point

Let $Ax = 0$ be a homogeneous system of linear equations which has infinitely many solutions, where A is an $m \times n$ matrix (where, $m > 1, n > 1$). Which of the following statements are possible?

- [ ] $rank(A) = m$ and $m < n$.
- [ ] $rank(A) = m$ and $m > n$.
- [ ] $rank(A) = m$ and $m = n$.
- [ ] $nullity(A) = n$.
- [ ] $nullity(A) \neq 0$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$rank(A) = m$ and $m < n$.
$nullity(A) = n$.
$nullity(A) \neq 0$.

Consider the coefficient matrix A of the following system of linear equations to answer questions 11 and 12:

$$3x_1 + 2x_2 + x_3 = 0$$

$$x_1 + x_3 = 0$$

Which one of the following vector spaces represents the null space of A appropriately? ***1 point***

- ( ) $\{(-t, t, t) \mid t \in \mathbb{R}\}$
- ( ) $\{(t_1, t_2, \frac{t_2 - t_1}{2}) \mid t_1, t_2 \in \mathbb{R}\}$
- ( ) $\{(t, -t, t) \mid t \in \mathbb{R}\}$
- ( ) $\{(t_1, t_2, \frac{t_1 + t_2}{2}) \mid t_1, t_2 \in \mathbb{R}\}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\{(-t, t, t) \mid t \in \mathbb{R}\}$

What will be the rank of A and nullity of A?

1 point

- $rank(A) = 3, nullity(A) = 2$
- $rank(A) = 2, nullity(A) = 1$
- $rank(A) = 1, nullity(A) = 2$
- $rank(A) = 2, nullity(A) = 0$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$rank(A) = 2, nullity(A) = 1$

Let $Ax = 0$ be a homogeneous system of linear equations which has a unique solution, where $A \in \mathbb{R}^{n \times n}$. What is the nullity of A?

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

1 point

Suppose $x_1 \neq 0$ solves $Ax = 0$, where $A \in \mathbb{R}^{2 \times 4}$. What is the minimum number of elements in a linearly independent subset of null space of A that also spans the set of solutions of $Ax = 0$?

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 2

1 point

Consider the following sets:

1 point

$S_1 = \{(1,2,3),(4,5,6),(8,9,10)\}$
$S_2 = \{(1,2,1),(2,4,2),(1,2,5)\}$
$S_3 = \{(1,2,3),(4,5,6),(7,8,10)\}$
$S_4 = \{(1,2),(4,5)\}$
$S_5 = \{(1,2),(4,5),(3,8)\}$

Choose the set of correct options

- [ ] S_1 is a basis of R^3.
- [ ] S_2 is a basis of R^3.
- [ ] S_3 is a basis of R^3.
- [ ] S_4 is a basis of R^2.
- [ ] S_5 is a basis of R^2.

No, the answer is incorrect.

Score: 0

Accepted Answers:

S_3 is a basis of R^3.
S_4 is a basis of R^2.