Week 2 : Assignment 2

The due date for submitting this assignment has passed.

Due on 2024-08-07, 23:59 IST.

Assignment submitted on 2024-08-07, 22:22 IST

1) Are the vectors $\begin{bmatrix}-2\\4\end{bmatrix}$, $\begin{bmatrix}7\\-2\end{bmatrix}$ and $\begin{bmatrix}3\\-6\end{bmatrix}$ linearly independent? ***1 point***

- Yes
- No

Yes, the answer is correct.
Score: 1
Accepted Answers:
No

2) Does the set, $S = \{(1,1),(1,2)\}$ spans $\mathbb{R}^2$? ***1 point***

- Yes
- No

Yes, the answer is correct.
Score: 1
Accepted Answers:
Yes

3) Consider the following system of linear equations of the form $Ax = b$: ***1 point***

$2x - 3y + 6z = 14$
$x + y - 2z = -3$
Which among the following are correct?

- [ ] $\begin{bmatrix} 1 \\ -4 \\ 0 \end{bmatrix}$ is a solution to $Ax = b$
- [ ] $\begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}$ is a solution to $Ax = b$
- [ ] $\begin{bmatrix} 1 \\ -4 \\ 0 \end{bmatrix}$ is a solution to $Ax = 0$
- [x] $\begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}$ is a solution to $Ax = 0$

Yes, the answer is correct.
Score: 1

Accepted Answers:

$\begin{bmatrix} 1 \\ -4 \\ 0 \end{bmatrix}$ *is a solution to* $Ax = b$

$\begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}$ *is a solution to* $Ax = 0$

Consider the following systerm of linear equation:

$x + y + z = -2$
$x + 2y - z = 1$
$2x + ay + bz = 2$

4) Find the conditions on a and b for which the above system has no solution. ***1 point***

- $2a + b - 6 = 0$
- (•) $a \neq 4, 2a + b - 6 = 0$
- $a = 4, b = -2$
- $2a + b - 6 \neq 0$

Yes, the answer is correct.
Score: 1

Accepted Answers:

$a \neq 4, 2a + b - 6 = 0$

5) Find the conditions on a and b for which the above system has a unique solution. ***1 point***

- $2a + b - 6 = 0$
- $a \neq 4, 2a + b - 6 = 0$
- $a = 4, b = -2$
- (•) $2a + b - 6 \neq 0$

Algebra (unit?unit=36&lesson=44)

Quiz: Week 2 : Assignment 2 (assessment?name=215)

Week 2 Feedback Form : Data Science for Engineers (unit?unit=36&lesson=154)

Week 3 ()

Week 4 ()

Week 5 ()

Week 6 ()

Week 7 ()

Week 8 ()

Text Transcripts ()

Download Videos ()

Books ()

Problem Solving Session - July 2024 ()

Yes, the answer is correct.
Score: 1

Accepted Answers:
$2a + b - 6 \neq 0$

6) Find the conditions on a and b for which the above system has infite number of solutions. ***1 point***

- $2a + b - 6 = 0$
- $a \neq 4, 2a + b - 6 = 0$
- $a = 4, b = -2$
- $2a + b - 6 \neq 0$

Yes, the answer is correct.
Score: 1

Accepted Answers:
$a = 4, b = -2$

Based on the given information, answer questions 7 and 8.

In solving the system $Ax = b$ in the variables $x1, x2, x3$ and $x4$, Gaussian elimination on the Augmented matrix $[A \mid b]$ led to the following row echelon form

$$\left(\begin{array}{cccc|c} 1 & 0 & 0 & 3 & 2 \\ 0 & 1 & 1 & 2 & 3 \\ 0 & 0 & 0 & 1 & 1/3 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right)$$

7) Identify the number of free variable from the above rwo echelon matrix. ***1 point***

- 0
- 1
- 2
- 3

Yes, the answer is correct.
Score: 1

Accepted Answers:
1

8) Which among the following is correct for the above system $Ax = b$? ***1 point***

- It has infinite number of solutions.
- It has a unique solution.
- It has no solution.

Yes, the answer is correct.
Score: 1

Accepted Answers:
It has infinite number of solutions.

9) For what values of a are matrix A = $\begin{bmatrix} a & 1 \\ -2 & a+3 \end{bmatrix}$ not invertible? ***1 point***

- [ ] a = 1
- [x] a = −2
- [x] a = −1
- [ ] a = 2

Yes, the answer is correct.
Score: 1

Accepted Answers:
a = −2
a = −1

10) Which among the following is true for the determinant of a matrix? ***1 point***

- [x] The determinant of a diagonal matrix is the product of its diagonal entries.
- [ ] If one row of a matrix is a scalar multiple of another, the determinant is 1
- [x] If one row of a matrix is a scalar multiple of another, the determinant is 0.
- [ ] The determinant of a permutation matrix can only be 1.

Yes, the answer is correct.
Score: 1

Accepted Answers:
The determinant of a diagonal matrix is the product of its diagonal entries.
If one row of a matrix is a scalar multiple of another, the determinant is 0.

11) Which among the following are the eigenvalues of matrix A = $\begin{pmatrix} 5 & 8 & 16 \\ 4 & 1 & 8 \\ -4 & -4 & -11 \end{pmatrix}$?. ***1 point***

- ( ) 1, 3, −3
- ( ) 1, 3, 3
- ( ) −1, 3, 3
- (•) 1, −3, −3

Yes, the answer is correct.
Score: 1

Accepted Answers:
1, −3, −3

12) Find the nullity of $A = \begin{bmatrix} 1 & -3 & -2 & 4 \\ 1 & -3 & 1 & 1 \\ 0 & 0 & 1 & -1 \end{bmatrix}$.

2

Yes, the answer is correct.
Score: 1

Accepted Answers:
(Type: Numeric) 2

1 point

13) ***1 point***

Let $A = \begin{bmatrix} -1 \\ 2 \\ 2 \end{bmatrix}$. Suppose the eigen values corresponding to AA^T are a, b and c, then find the value of $ab + bc + ca$.

- 9
- 0
- 81
- 18

Yes, the answer is correct.
Score: 1

Accepted Answers:
0