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**NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Data Science For Engineers (course)**



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### Course outline

**How does an NPTEL  
online course work? ()**

**Setup Guide ()**

**Pre Course Material ()**

## Week 2: Assignment 2

The due date for submitting this assignment has passed.

**Due on 2023-08-09, 23:59 IST.**

As per our records you have not submitted this assignment.

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?

- ☐ Yes  
☐ No

No, the answer is incorrect.

Score: 0

Accepted Answers:

No

**1 point**



**Week 0 ()****Week 1 ()****Week 2 ()**

- ☐ Linear Algebra for Data science (unit? unit=36&lesson=37)
- ☐ Solving Linear Equations (unit? unit=36&lesson=38)
- ☐ Solving Linear Equations ( Continued ) (unit? unit=36&lesson=39)
- ☐ Linear Algebra - Distance,Hyperplanes and Halfspaces,Eigenvalues,Eigenvectors (unit? unit=36&lesson=40)
- ☐ Linear Algebra - Distance,Hyperplanes and Halfspaces,Eigenvalues,Eigenvectors ( Continued 1) (unit? unit=36&lesson=41)
- ☐ Linear Algebra - Distance,Hyperplanes and Halfspaces,Eigenvalues,Eigenvectors ( Continued

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

1 point

- ☐ Yes  
☐ No

No, the answer is incorrect.

Score: 0

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  $Ax = 0$

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

No, the answer is incorrect.



2 ) (unit?  
unit=36&lesson=42)

☐ Linear Algebra -  
Distance,Hyperplanes  
and  
Halfspaces,Eigenvalues,E  
igenvectors ( Continued  
3 ) (unit?  
unit=36&lesson=43)

☐ Common doubts asked  
on Linear Algebra (unit?  
unit=36&lesson=44)

☐ Practice: Week 2:  
Assignment 2 (Non  
Graded) (assessment?  
name=142)

☐ **Quiz: Week 2:  
Assignment 2  
(assessment?  
name=162)**

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

☒ Week 2: Solution (unit?  
unit=36&lesson=168)

**Week 3 ()**

**Week 4 ()**

**Week 5 ()**

Score: 0

Accepted Answers:

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

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

Consider the following system 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**

☐  
 $2a + b - 6 = 0$

☐  
 $a \neq 4, 2a + b - 6 = 0$

☐  
 $a = 4, b = -2$

☐  
 $2a + b - 6 \neq 0$

No, the answer is incorrect.

Score: 0

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**

☐  
 $2a + b - 6 = 0$

☐  
 $a \neq 4, 2a + b - 6 = 0$

☐  
 $a = 4, b = -2$

☐



Week 6 ()

Week 7 ()

Week 8 ()

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Problem Solving  
Session - July 2023 ()

$$2a + b - 6 \neq 0$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$2a + b - 6 \neq 0$$

6) Find the conditions on  $a$  and  $b$  for which the above system has infinite number of solutions.

1 point

☐

$$2a + b - 6 = 0$$

☐

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

☐

$$a = 4, b = -2$$

☐

$$2a + b - 6 \neq 0$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$a = 4, b = -2$$

In solving the system  $Ax = b$  in the variables  $x_1, x_2, x_3$  and  $x_4$ , Gaussian elimination on the Augmented matrix  $[A|b]$  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 row echelon matrix.

1 point

☐ 0

☐ 1

☐ 2



☐ 3

No, the answer is incorrect.

Score: 0

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.

No, the answer is incorrect.

Score: 0

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

☐

$a = 1$

☐

$a = -2$

☐

$a = -1$

☐

$a = 2$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$a = -2$

$a = -1$

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

1 point

☐ 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.
- ☐ 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.

No, the answer is incorrect.

Score: 0

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

**1 point**

$$A = \begin{pmatrix} 5 & 8 & 16 \\ 4 & 1 & 8 \\ -4 & -4 & -11 \end{pmatrix}?$$

- ☐ 1, 3, -3
- ☐ 1, 3, 3
- ☐ -1, 3, 3
- ☐ 1, -3, -3

No, the answer is incorrect.

Score: 0

Accepted Answers:

1, -3, -3

12)

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 2



1 point

1 point

13) 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

No, the answer is incorrect.

Score: 0

Accepted Answers:

0

