Started on	Sunday, 6 June 2021, 2:02 PM
State	Finished
Completed on	Sunday, 6 June 2021, 3:32 PM
Time taken	1 hour 30 mins
Grade	**26.00** out of 30.00 (**87**%)

Question 1

Correct

Mark 1.00 out of 1.00

If A is skew-symmetric matrix, then A^2 is a

Select one:

- a. Lower Triangular Matrix
- b. skew-symmetric matrix
- c. symmetric matrix ✓
- d. Upper Triangular Matrix

Your answer is correct.

The correct answer is: symmetric matrix

Question 2

Correct

Mark 1.00 out of 1.00

Let $W = \{(x_1, x_2, x_3) \in R^3 : x_1 + x_2 + x_3 = 1\}$, then W is a subspace of R^3

Select one:

- a. True
- b. False ✓

Your answer is correct.

The correct answer is: False

Question 3

Correct

Mark 1.00 out of 1.00

The linear span of the vectors $(1,2),(3,4)$ is R^2.

Select one:

- a. False
- b. True ✓

Your answer is correct.

The correct answer is: True

Question 4

Correct

Mark 1.00 out of 1.00

The set $\{(0,0),(1,0),(0,1)\}$ is linearly independent.

Select one:

- a. False ✓
- b. True

Your answer is correct.

The correct answer is: False

Question 5

Correct

Mark 1.00 out of 1.00

Write down the dimension of the nullspace of the following matrix

$$\begin{bmatrix} 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 1 & 2 & 0 & 1 \end{bmatrix}$$

Select one:

- a. 2 ✓
- b. 4
- c. 1
- d. 3

Your answer is correct.

The correct answer is: 2

Question 6

Correct

Mark 1.00 out of 1.00

The mapping $T : R^2 \to R^2$ is defined by $T(x_1, x_2) = (x_1 + x_2, x_2^2)$ is a linear mapping.

Select one:

- a. False ✓
- b. True

Your answer is correct.

The correct answer is: False

Question 7

Correct

Mark 1.00 out of 1.00

Let the linear mapping $T : R^2 \to R^3$ be defined by $T(x_1, x_2) = (x_1, x_1 + x_2, x_2)$. Then the nullity of T is

Select one:

- a. 0 ✓
- b. 2
- c. 1
- d. 3

Your answer is correct.

The correct answer is: 0

Question 8

Correct

Mark 1.00 out of 1.00

The distinct eigen values of the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

Select one:

- a. 0 and 2 ✓
- b. 1 and 2
- c. 1 and -1
- d. 0 and 1

Your answer is correct.

The correct answer is: 0 and 2

Question 9

Correct

Mark 1.00 out of 1.00

The number of linearly independent eigenvectors of the matrix $\begin{bmatrix} 2 & 2 & 0 & 0 \\ 2 & 1 & 0 & 0 \\ 0 & 0 & 3 & 0 \\ 0 & 0 & 1 & 4 \end{bmatrix}$ is

Select one:

- a. 1
- b. 2
- c. 4 ✓
- d. 3

Your answer is correct.

The correct answer is: 4

Question **10**

Correct

Mark 1.00 out of 1.00

The dimension of the subspace $W = \{(x_1, x_2, x_3, x_4, x_5) : 3x_1 - x_2 + x_3 = 0\}$ of R^5 is

Select one:

- a. 3
- b. 1
- c. 2
- d. 4 ✓

Your answer is correct.

The correct answer is: 4

Question **11**

Correct

Mark 2.00 out of 2.00

Determine the rank of the following matrix $\begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 4 & 6 & 7 & 8 \\ 3 & 6 & 9 & 12 & 15 \\ 4 & 8 & 12 & 14 & 16 \end{bmatrix}$

Select one:

- a. 4
- b. 3
- c. 2 ✓
- d. 1

Your answer is correct.

The correct answer is: 2

Question 12

Correct

Mark 2.00 out of 2.00

Investigate for what values of λ and μ the following equations have an infinite number of solutions

$$x + y + z = 6$$
$$x + 2y + 3y = 10$$
$$x + 2y + \lambda z = \mu$$

Select one:

- a. $\lambda = 2$ and $\mu = 9$
- b. $\lambda = 3$ and $\mu = 10$ ✓
- c. $\lambda = 1$ and $\mu = 10$
- d. $\lambda = 3$ and $\mu = 9$

Your answer is correct.

The correct answer is: $\lambda = 3$ and $\mu = 10$

Question 13

Correct

Mark 2.00 out of 2.00

Determinant value of the matrix $\begin{pmatrix} a+d & a+d+k & a+d+c \\ c & c+b & c \\ d & d+k & d+c \end{pmatrix}$ is

Select one:

- a. abcdk
- b. adk
- c. abc ✓
- d. adc

Your answer is correct.

The correct answer is: abc

Question 14

Correct

Mark 2.00 out of 2.00

A linear mapping $T : R^3 \to R^3$ is defined by $T(x_1, x_2, x_3) = (x_1 + x_2 - x_3, 2x_1 - x_2 + x_3, x_1 - 2x_2 + 2x_3)$. Find $Ker(T)$

Select one:

a. $Ker(T) = 2$

b. $Ker(T) = 1$ ✓

c. $Ker(T) = 3$

d. $Ker(T) = 0$

Your answer is correct.

The correct answer is: $Ker(T) = 1$

Question 15

Correct

Mark 2.00 out of 2.00

Let $\{(1,1,0),(1,0,0),(1,1,1)\}$ is a basis of R^3, Then find the orthonormal basis for R^3 using Gram-Schmidt process with the following inner product

$< x, y >= (x_1 y_1 + x_2 y_2 + x_3 y_3)$ where $x = (x_1, x_2, x_3), y = (y_1, y_2, y_3) \in R^3$

Select one:

a. $\{\frac{1}{\sqrt(2)}(1,1,0),(1,0,0),(0,0,1)\}$

b. $\{\frac{1}{\sqrt(2)}(1,1,0),\frac{1}{\sqrt(2)}(1,-1,0),(0,0,1)\}$ ✓

c. $\{(0,1,0),(1,0,0),(0,0,1)\}$

d. $\{\frac{1}{\sqrt(2)}(1,1,0),\frac{1}{\sqrt(2)}(1,-1,0),\frac{1}{\sqrt(2)}(1,1,1)\}$

Your answer is correct.

The correct answer is: $\{\frac{1}{\sqrt(2)}(1,1,0),\frac{1}{\sqrt(2)}(1,-1,0),(0,0,1)\}$

Question 16

Correct

Mark 2.00 out of 2.00

If the nullity of the matrix $\begin{bmatrix} k & 1 & 2 \\ 1 & -1 & -2 \\ 1 & 1 & 4 \end{bmatrix}$ is 1 , then the value of k is

Select one:

a. -1 ✓

b. 2

c. 0

d. 1

Your answer is correct.

The correct answer is: -1

Question 17

Correct

Mark 2.00 out of 2.00

Let $T : R^4 \to R^4$ be the linear map, satisfying $T(1,0,0,0) = (0,1,0,0)$,,\\ where

$$T(0,1,0,0) = (0,0,1,0),$$
$$T(0,0,1,0) = (0,0,0,0),$$
$$T(0,0,0,1) = (0,0,1,0)$$

$(1,0,0,0), (0,1,0,0), (0,0,1,0), (0,0,0,1)$ is the ordered basis of R^4. Then

Select one:

a. $Rank(T) = 2$ ✓

b. $Rank(T) = 4$

c. $Rank(T) = 1$

d. $Rank(T) = 3$

Your answer is correct.

The correct answer is: $Rank(T) = 2$

Question 18

Incorrect

Mark 0.00 out of 2.00

A basis of $V = \{(x_1, x_2, x_3, x_4) \in R^4 : x_1 + x_2 - x_3 = 0, x_2 + x_3 + x_4 = 0,$ is
$2x_1 + x_2 - 3x_3 - x_4 = 0\}$

Select one:

a. $\{(1,1,-1,0), (0,1,1,1), (2,1,-3,1)\}$

b. $\{(1,0,1,-1)\}$ ✗

c. $\{(2,-1,1,0), (1,-1,0,1)\}$

d. $\{(1,-1,0,1)\}$

Your answer is incorrect.

The correct answer is: $\{(2,-1,1,0), (1,-1,0,1)\}$

Question **19**

Incorrect

Mark 0.00 out of 2.00

A linear mapping $T : R^3 \to R^3$ is defined by $T(x_1, x_2, x_3) = (x_1 + x_2 - x_3, x_1 + x_2 + x_3, x_2 - x_3)$. Find the matrix of T with respect to the ordered basis $\{(0,1,0), (0,0,1), (1,0,0)\}$ of R^3

Select one:

a. $\begin{bmatrix} 1 & 1 & 1 \\ 1 & -1 & 0 \\ 1 & -1 & 1 \end{bmatrix}$

b. $\begin{bmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 1 & 0 & -1 \end{bmatrix}$

c. $\begin{bmatrix} 1 & -1 & 1 \\ 1 & 1 & 1 \\ 1 & -1 & 0 \end{bmatrix}$

d. $\begin{bmatrix} 1 & 1 & -1 \\ 1 & 1 & 1 \\ 0 & 1 & -1 \end{bmatrix}$

Your answer is incorrect.

The correct answer is: $\begin{bmatrix} 1 & 1 & 1 \\ 1 & -1 & 0 \\ 1 & -1 & 1 \end{bmatrix}$

Question **20**

Correct

Mark 2.00 out of 2.00

Let A be a 3×3 matrix. Suppose that the eigen values of A are $-1, 0, 1$ with respective eigen vectors $\begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$, $\begin{bmatrix} 1 \\ 1 \\ -2 \end{bmatrix}$, $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$. Then $6A$ equals

Select one:

a. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

b. $\begin{bmatrix} -1 & 5 & 2 \\ 5 & -1 & 2 \\ 2 & 2 & 2 \end{bmatrix}$ ✓

c. $\begin{bmatrix} -3 & 9 & 0 \\ 9 & -3 & 0 \\ 0 & 0 & 6 \end{bmatrix}$

d. $\begin{bmatrix} 1 & 5 & 3 \\ 5 & 1 & 3 \\ 3 & 3 & 3 \end{bmatrix}$

Your answer is correct.

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