Started on	Wednesday, 25 October 2017, 12:38 PM
State	Finished
Completed on	Wednesday, 25 October 2017, 4:00 PM
Time taken	3 hours 21 mins
Overdue	2 hours 6 mins
Marks	2.00/50.00
Grade	**0.40** out of 10.00 (**4**%)

Question **1**

Not answered

Marked out of 1.00

Let $T: R^2 \to R^2$ be a linear transformation such that $T(u) = (1,2), T(v) = (-1,0)$ for given $u, v \in R^2$. Find $T(2u - 3v)$

A. $(-2,8)$ B. $(-2,4)$ C. $(1,0)$ D. $(5,4)$

Select one:

- a. A
- b. D
- c. B
- d. C

Question **2**

Not answered

Marked out of 1.00

Find the dimension of U = span{(1, 2, -1); (3, 1, 1); (-1, 2, 0); (0, 1, 1)}

Select one:

- a. 0
- b. 3
- c. 2
- d. 4
- e. 1

Question **3**

Not answered

Marked out of 1.00

If A is a 2×2 invertible matrix and $(3A)^{-1} = \begin{bmatrix} -1 & -3 \\ 4 & 5 \end{bmatrix}$, what is the $(1,1)$-entry of A?

Select one:

- a. -5/21
- b. -25/3
- c. 5/21
- d. 5/3
- e. 15/7

Question **4**

Not answered

Marked out of 1.00

Let A be a 3x5 matrix. Choose correct statements

(i) A can have rank 3

(ii) A can have rank 5

(iii) A can have linearly independent rows

(iv) A can have linearly independent columns

A. (i) only

B. (i) and (iii) only

C. (ii) and (iv) only

D. (iv) only

Select one:

- a. A
- b. C
- c. B
- d. D

Question **5**

Not answered

Marked out of 1.00

Find the first row of adjugate of the matrix $\begin{pmatrix} 0 & 2 & -4 \\ 2 & 3 & -1 \\ 1 & 4 & 1 \end{pmatrix}$

A. [7, 18, 10] B. [7, -18, 10] C. [7, -3, 5] D. [7/26, 9/13, -5/13]

Select one:

- a. C
- b. B
- c. D
- d. A

Question **6**

Complete

Mark 1.00 out of 1.00

Which one of the following is a basis for the subspace of $\mathbb{R}^3$ defined by $G = \{(x, y, z) : 2x - y + 3z = 0\}$?

Select one:

- a. {(1, 0, 0), (1, 2, 0)}
- b. {(1; 2; 0)}
- c. {(1, 0, 0); (0, 1, 0); (0, 0, 1)}
- d. None of the others
- e. {(1; 2; 0); (0; 3; 1)}

Question **7**

Not answered

Marked out of 1.00

Which condition on the numbers a, b, c is the vector $(a, b, c) \in span\{(1, 0, 2), (1, 2, 8)\}$

A. $c = 2a + 3b$ B. $c = -2a - 3b$ C. $c = 2a - 3b$ D. $c = -2a + 3b$

Select one:

- a. B
- b. D
- c. C
- d. A

Question **8**

Not answered

Marked out of 1.00

Let $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 2 \\ 1 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 1 & 1 \\ -4 & 2 & 0 \\ 1 & 2 & 1 \end{bmatrix}$. What is the $(1,2)$-entry of the matrix $AB - BA$?

Select one:

- a. -4
- b. None of the others
- c. 2
- d. -2
- e. 1

Question **9**

Not answered

Marked out of 1.00

Find the value(s) of t for which (1,3,-2,2t) lies in the subspace spanned by (1,1,2,2), (1,3,2,2), and (1,4,3,3).

Select one:

- a. 1
- b. 2
- c. 1 or -1
- d. -2
- e. -1

Question **10**

Not answered

Marked out of 1.00

Find m such that the set $\{(2,m,1),(m,0,0),(1,1,m)\}$ is a basis of $\mathbb{R}^3$

A. $m \neq 0$ B. $m \neq \pm 1$ C. $m \neq 1$ D. $m \in R \setminus \{0,1,-1\}$

Select one:

- a. D
- b. B
- c. A
- d. C

Question **11**

Not answered

Marked out of 1.00

Let $U = \text{span}\{(1,-2,3,4),(-3,6,-5,-16),(-1,2,-5,-2)\}$. Find all t such that $(1,t,3,4) \in U$.

Select one:

- a. t =1
- b. t = 0
- c. None of the others
- d. t = -1
- e. t = -2

Question **12**

Not answered

Marked out of 1.00

Find all values of m such that the folowing system has no solution

$$\begin{cases} x-2y+z=0 \\ x+y+3z=1 \\ 2x-y+4z=m \end{cases}$$

Select one:

- a. m = 1
- b. Any number
- c. m ≠ 1
- d. m = 0

Question **13**

Not answered

Marked out of 1.00

Let A be the augmented matrix of a homogeneous of 3 equations in 6 variables. If rank(A) = 1, how many solutions and how many parameters does this system have?

A. Infinitely many solutions and 3 parameters

B. Infinitely many solutions and 2 parameters

C. Infinitely many solutions and 5 parameters

D. Unique solution

Select one:

- a. B
- b. D
- c. A
- d. C

Question **14**

Not answered

Marked out of 1.00

Which of the following statements are true for invertible $n \times n$ matrices A, B, and C?

(i) $(A+B)^{-1} = A^{-1} + B^{-1}$

(ii) $(ABC)^{-1} = C^{-1}B^{-1}A^{-1}$

(iii) $A^2B^2 = (AB)^2$

(iv) $(A+B)^2 = A^2 + 2AB + B^2$

(v) $(A+C)(A-C) = A^2 - C^2$

Select one:

- a. (ii) and (v)
- b. (i) and (ii) only
- c. (i) and (iv) only
- d. None of the others
- e. (ii) and (iii) only

Question **15**

Not answered

Marked out of 1.00

Determine whether the statement is true

Select one:

- a. Elementary row operations permit one row of an augmented matrix to be subtracted from another.
- b. A homogeneous linear system in n unknowns whose corresponding augmented matrix has a reduced row echelon form with r leading 1's has r free variables.
- c. If the number of equations in a linear system exceeds the number of unknowns, then the system must be inconsistent.
- d. A single linear equation with two or more unknowns must have infinitely many solutions

Question **16**

Not answered

Marked out of 1.00

Let A_{3x5} be the augment matrix of a homogeneous system of linear equation. If rank(A) = 1, how many solutions and parameters does this system have?

Select one:

- a. No solution
- b. infinitely many solutions and 4 parameter
- c. Unique solution
- d. infinitely many solutions and 1 parameter
- e. infinitely many solutions and 3 parameter

Question **17**

Not answered

Marked out of 1.00

Let $B = \begin{bmatrix} 1 & 1 & -1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$. Then the second row of B^{-1} is

Select one:

- a. [0 -1 1]
- b. [0 1 -1]
- c. [-1 1 0]
- d. [1 0 -1]
- e. None of the others

Question **18**

Not answered

Marked out of 1.00

Consider the matrix

$$A=\begin{pmatrix} 2 & -1 & 1 \\ -4 & 2 & 2 \\ 4 & 2 & 3 \end{pmatrix}$$

If A is the augmented matrix of a system of linear equations, determine the number of equations and the number of variables.

Select one:

- a. 3 equations, 3 unknows
- b. 2 equations, 3 unknows
- c. 2 equations, 2 unknows
- d. 3 equations, 2 unknows

Question **19**

Not answered

Marked out of 1.00

Find all the eigenvalues of the matrix $\begin{pmatrix} 2 & 1 & 5 \\ 0 & 1 & 1 \\ 0 & -8 & 7 \end{pmatrix}$

A. 2,1,7 B. 2,3,5 C. 2,2,6 D. None of the others

Select one:

- a. A
- b. D
- c. B
- d. C

Question **20**

Not answered

Marked out of 1.00

If $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = 7$, find $\begin{vmatrix} 3a-5g & g & d \\ 3b-5h & h & e \\ 3c-5i & i & f \end{vmatrix}$.

Select one:

- a. 35
- b. -35
- c. -7
- d. 21
- e. 7
- f. -21

Question **21**

Not answered

Marked out of 1.00

Find all values m such that the system of equations $\begin{cases} x+y-z=1 \\ x+2y+mz=0 \\ 2x+3y-2z=m \end{cases}$ has exactly one solution

A. $m \neq 1$ B. $m \neq 2$ C. $m \neq -1$ D. $m = -1$

Select one:

- a. D
- b. B
- c. C
- d. A

Question **22**

Not answered

Marked out of 1.00

The $(2,3)$-entry of the product $\begin{bmatrix} 1 & 2 & 0 & 1 \\ 0 & 2 & 5 & 1 \\ 4 & -1 & 2 & 3 \end{bmatrix} \begin{bmatrix} 4 & 2 & 1 \\ 2 & 3 & 2 \\ 5 & 1 & 0 \\ 0 & 4 & 3 \end{bmatrix}$ is:

Select one:

- a. 8
- b. 10
- c. 11
- d. 7
- e. 9

Question **23**

Not answered

Marked out of 1.00

If ABC can be formed and A is 4x4, C is 7x7. What is the size of B?

A. 4x7 B. 4x4 C. 7x4 D. 7x7

Select one:

- a. C
- b. B
- c. A
- d. D

Question **24**

Not answered

Marked out of 1.00

Find all values of m such that the set {(1, -1, 2); (3, 0, 1); (-2, m, 1)} is linearly independent.

Select one:

- a. m = 1 only
- b. m ≠ -1
- c. m = 3 only
- d. m = -1 only
- e. None of the others

Question **25**

Not answered

Marked out of 1.00

Find the eigenvalues of $\begin{bmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{bmatrix}$.

Select one:

- a. None of the others
- b. -1,2,-3
- c. 1,-2,3
- d. 1,2,3
- e. 1, -2, 2

Question **26**

Not answered

Marked out of 1.00

Find all solutions of the following system of linear equations $\begin{cases} x-y-z=3 \\ -x-y+z=-1 \end{cases}$

A. $x=3, y=-1, z=1$

B. $x=1, y=-1, z=-1$

C. $x=t-2, y=-1, z=t$

D. $x=t, y=-1, z=t-2$

Select one:

- a. D
- b. C
- c. B
- d. A

Question **27**

Complete

Mark 0.00 out of 1.00

The characteristic polynomial of $A=\begin{pmatrix}3 & -2\\ 1 & 0\end{pmatrix}$ is

A. $(x-2)(x+1)$

B. x^2-3x+2

C. $(x+2)(x+1)$

D. x^2

Select one:

- a. B
- b. C
- c. D
- d. A

Question **28**

Not answered

Marked out of 1.00

Give that $\lambda=1$ is an eigenvalua for the matrix $A=\begin{pmatrix}1 & 1 & 1\\ 0 & 1 & 1\\ 0 & 0 & 0\end{pmatrix}$. Find a set of basic eigenvectors corresponding to this eigenvalue $\lambda=1$

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

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

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

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

Select one:

- a. A
- b. D
- c. C
- d. B

Question **29**

Not answered

Marked out of 1.00

Let $A=\begin{pmatrix}1 & 2\\ 1 & 3\end{pmatrix}$ and $B=\begin{pmatrix}-1 & 2\\ 2 & -3\end{pmatrix}$. Solve $AXB=BA$, where X is a matrix

A. $X=I$

B. $X=\begin{pmatrix}59 & 32\\ -24 & -13\end{pmatrix}$

C. $X=\begin{pmatrix}27 & -16\\ -32 & 19\end{pmatrix}$

D. None of the others

Select one:

- a. C
- b. D
- c. A
- d. B

Question **30**

Not answered

Marked out of 1.00

Compute the rank of $A=\begin{pmatrix}1 & 1 & -1 & 2\\ 2 & 1 & 3 & 0\\ 0 & 1 & -5 & 4\end{pmatrix}$

Select one:

- a. 3
- b. 2
- c. 1
- d. 4

Question **31**

Not answered

Marked out of 1.00

Find the (1,2) - cofactor of the matrix $\begin{pmatrix} 1 & 2 & 3 \\ 4 & -1 & 5 \\ 0 & 7 & 6 \end{pmatrix}$

A. 24 B. -24 C. 9 D. $\begin{pmatrix} 4 & 5 \\ 0 & 6 \end{pmatrix}$

Select one:

- a. D
- b. C
- c. B
- d. A

Question **32**

Not answered

Marked out of 1.00

Let $A = \begin{pmatrix} 1 & * & * & * \\ 0 & 3 & * & * \\ 0 & 0 & 5 & * \\ 0 & 0 & 0 & 7 \end{pmatrix}$, where (*) denotes any real number. Compute $\det\left(2A^{-1}\right)$

A. $\frac{2}{105}$ B. 210 C. $\frac{16}{105}$ D. None of the others

Select one:

- a. B
- b. C
- c. D
- d. A

Question **33**

Not answered

Marked out of 1.00

Let V=span{(1,2,3,4),(3,2,5,1),(2,1,0,1)}. Find all t such that (1,2,t,3)∈V.

Select one:

- a. 9
- b. 1
- c. -3
- d. 27/5
- e. 5

Question **34**

Not answered

Marked out of 1.00

Find m such that the matrix $\begin{pmatrix} 0 & m & -4 \\ 2 & 3 & -1 \\ 1 & 4 & 1 \end{pmatrix}$ is not invertible

A. All numbers but -20/3

B. All numbers but 20/3

C. 20/3

D. -20/3

Select one:

- a. C
- b. A
- c. D
- d. B

Question **35**

Not answered

Marked out of 1.00

Find all values of m such that the following system has no solution

$$\begin{cases} x+y-z=2 \\ 3x-y+2z=3 \\ 2x-2y+3z=m \end{cases}$$

A. Any number

B. All numbers but 1

C. 1

D. 7

Select one:

- a. B
- b. A
- c. C
- d. D

Question **36**

Not answered

Marked out of 1.00

A is a 4×4 matrix with det A = 3. If adj(A) denotes the transpose of the matrix of cofactors of A, find det(adj(A)).

Select one:

- a. 3
- b. 27
- c. 9
- d. 81

Question **37**

Complete

Mark 1.00 out of 1.00

A is a 4x4 matrix with det A = 4. If adj(A) denotes the transpose of the matrix of cofactors of A, find det(adj(A)).

Select one:

- a. 16
- b. 1/16
- c. 4
- d. 1/64
- e. 64

Question **38**

Not answered

Marked out of 1.00

Find all values of m for which the folowing system of equations has nontrivial solutions:

$x - 2y + z = 0$

$x + my - 3z = 0$

$-x + 6y - 5z = 0$

Select one:

- a. m = 2
- b. m = -2
- c. $m \neq -2$
- d. $m \neq 2$
- e. No such m

Question **39**

Not answered

Marked out of 1.00

Every linear system can be written as a matrix equation AX = B where:

Select one:

- a. A is a square matrix.
- b. A and B are equal
- c. B is the augmented matrix
- d. None of the others
- e. A is the augmented matrix.

Question **40**

Not answered

Marked out of 1.00

Find x such that the set $\left\{\begin{pmatrix}2\\x\\-1\end{pmatrix},\begin{pmatrix}2\\0\\1\end{pmatrix},\begin{pmatrix}0\\1\\2\end{pmatrix}\right\}$ is independent

A. $x \neq -1$ B. $x = 1$ C. $x \neq 2$ D. None of the others

Select one:

- a. C
- b. B
- c. D
- d. A

Question **41**

Not answered

Marked out of 1.00

Find the system of linear equations whose augmented matrix is given as

$$\begin{bmatrix}1 & -2 & 0 & 6\\-3 & 1 & 5 & 2\\0 & 1 & 3 & 4\end{bmatrix}$$

A. $\begin{cases}x-2y=6\\3x-y-5z=-2\\y+3z=-4\end{cases}$

B. $\begin{cases}x-2y=6\\3x-y-5z=2\\y+3z=4\end{cases}$

C. $\begin{cases}x-2y=6\\3x-y-5z=-2\\y+3z=4\end{cases}$

D. $\begin{cases}x-2y+6t=0\\-3x+y+5z+2t=0\\y+3z+4t=0\end{cases}$

Select one:

- a. B
- b. D
- c. A
- d. C

Question **42**

Not answered

Marked out of 1.00

Let A and B be $n \times n$ matrices, and k be a scalar. Which two of the following statements are false?

(i) $\det(AB) = \det A \det B$

(ii) $\det A + \det B = \det(A + B)$

(iii) $\det(kA) = k \det A$

(iv) $\det(kA) = k^n \det A$

(v) $\det(A^T) = \det A$

Select one:

- a. (i) and (ii) only
- b. (i) and (iv) only
- c. (ii) and (iii) only
- d. (iii) and (iv) and (v)
- e. (ii) and (v) only

Question **43**

Not answered

Marked out of 1.00

What is the dimension of the subspace spanned by $\mathbf{w} = (1, -1, 4, -5)$, $\mathbf{x} = (2, 1, 5, -1)$, $\mathbf{y} = (0, 1, -1, 3)$ and $\mathbf{z} = (3, 4, 5, 6)$?

Select one:

- a. 3
- b. 0
- c. 2
- d. 1
- e. 4

Question **44**

Not answered

Marked out of 1.00

Solve the folowing system of equations

x + 10z = 5

3x + y - 4z = -1

4x + y + 6z = 1

Select one:

- a. x = 5; y = -16; z = 0
- b. x = 5 + 27; y = -16 - t; z = t
- c. None of the others
- d. No solution

Question **45**

Complete

Mark 0.00 out of 1.00

Let $U = \{(a,b,c,d) \mid 3a - 5b = 0, b + c + d = 0\}$ be a subspace of R^4.

Find the dimension of U

A. 1 B. 2 C. 3 D. 4

Select one:

- a. D
- b. A
- c. B
- d. C

Question **46**

Not answered

Marked out of 1.00

Find all values of k for which the given augmented matrix corresponds to a consistent linear system.

$$\begin{bmatrix} 1 & k & -4 \\ 4 & 8 & 2 \end{bmatrix}$$

Select one:

- a. $k \neq 2$
- b. $k = 2$
- c. $k \neq 0$
- d. $k \neq -2$
- e. Any number

Question **47**

Not answered

Marked out of 1.00

If B is a 3×3 matrix and $\det B = 5$, then $\det(2B^{-1})$ is:

Select one:

- a. 2/5
- b. 5/8
- c. 1/40
- d. 8/5
- e. 1/10

Question **48**

Not answered

Marked out of 1.00

The $(3,2)$-cofactor of the matrix $\begin{bmatrix} 1 & 3 & -2 \\ 4 & 5 & -7 \\ 7 & 8 & 10 \end{bmatrix}$ is:

Select one:

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

Question **49**

Not answered

Marked out of 1.00

Find the eigenvalues of $\begin{bmatrix} 1 & 1 & -1 \\ 0 & 0 & -1 \\ 0 & 2 & -3 \end{bmatrix}$.

Select one:

- a. 1,-2,3
- b. 1,-2,2
- c. None of the others
- d. 1,-1,-2
- e. -1,2,-2

Question **50**

Not answered

Marked out of 1.00

Let $U=\{(x,y,z)\mid 2x-y+z=0\}$ be a subspace of R^3. Which of the following statements are true?

(i) $U=span\{(1,0,-2),(0,1,1)\}$

(ii) $U=span\{(1,2,0)\}$

A. (i) only B. Both (i) and (ii) C. (ii) only D. None

Select one:

- a. D
- b. A
- c. B
- d. C