Started on	Friday, 24 June 2022, 8:11 AM
State	Finished
Completed on	Friday, 24 June 2022, 8:12 AM
Time taken	11 secs

Question 1

Not answered

Marked out of 0.60

Find a 2×2 matrix A such that $(A^T - 2I)^{-1} = \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$.

a) $\begin{bmatrix} -3 & 1 \\ 1 & -4 \end{bmatrix}$

b) $\begin{bmatrix} 4 & 1 \\ 1 & 3 \end{bmatrix}$

c) $\begin{bmatrix} 4 & -1 \\ -1 & 3 \end{bmatrix}$

d) $\begin{bmatrix} 3 & -1 \\ -1 & 4 \end{bmatrix}$

e) $\begin{bmatrix} 3 & -1 \\ 1 & -4 \end{bmatrix}$

f) No such matrix A exists.

- a. B
- b. E
- c. C
- d. A
- e. F
- f. D

The correct answer is:
D

Question 2
Not answered
Marked out of 0.60

Let $T : \mathbb{R}^2 \to \mathbb{R}^2$ be a linear transformation, and assume that $T\begin{bmatrix} 2 \\ -1 \end{bmatrix} = \begin{bmatrix} 5 \\ 8 \end{bmatrix}$ and $T\begin{bmatrix} 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 4 \\ 7 \end{bmatrix}$. Compute $T^{-1}\begin{bmatrix} 7 \\ 2 \end{bmatrix}$:

a) $\begin{bmatrix} 29 \\ -12 \end{bmatrix}$ b) $\begin{bmatrix} -12 \\ 29 \end{bmatrix}$ c) $\begin{bmatrix} 12 \\ -29 \end{bmatrix}$ d) None of these

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

The correct answer is:
C

Question 3
Not answered
Marked out of 0.60

If A is an $n \times 2$ matrix and $B = \begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$, then the second column of the matrix AB is:

a) not defined unless $n = 2$.
b) the same as the second column of A.
c) the same as the second column of B.
d) the same as the first column of A.
e) the same as the first column of B.
f) the same as the sum of the first and second columns of A.

- a. E
- b. A
- c. B
- d. C
- e. D
- f. F

The correct answer is:
D

Question **4**

Not answered

Marked out of 0.60

Suppose $A = \begin{bmatrix} 1 & -2 & 0 & -1 \\ -1 & 5 & 1 & 2 \\ 0 & 6 & 1 & 3 \\ -2 & 8 & 2 & 3 \end{bmatrix}$. Which one of the following statements is correct?

a) The third row of A^{-1} is $[0 \quad -6 \quad 5 \quad 3]$.

b) The second column of A^{-1} is $[2 \quad 5 \quad -6 \quad -8]^T$.

c) The fourth row of A^{-1} is $[2 \quad -8 \quad 2 \quad 3]$.

d) A^{-1} does not exist.

e) The first row of A^{-1} is $[1 \quad -2 \quad 0 \quad -1]$.

f) The first column of A^{-1} is $[1 \quad 1 \quad 0 \quad 1]^T$.

- a. A
- b. C
- c. D
- d. E
- e. F
- f. B

The correct answer is:
B

Question 5
Not answered
Marked out of 0.60

The inverse of the matrix $\begin{bmatrix} 1 & x \\ -x & 1 \end{bmatrix}$

a) exists if and only if $x \neq 0$

b) is $\frac{1}{1+x^2}\begin{bmatrix} 1 & -x \\ x & 1 \end{bmatrix}$

c) is $\frac{1}{1-x^2}\begin{bmatrix} 1 & -x \\ x & 1 \end{bmatrix}$

d) is $\frac{1}{1+x^2}\begin{bmatrix} x & 1 \\ 1 & -x \end{bmatrix}$

e) is $\frac{1}{1+x^2}\begin{bmatrix} 1 & x \\ -x & 1 \end{bmatrix}$

f) is $\frac{1}{1-x^2}\begin{bmatrix} x & 1 \\ 1 & -x \end{bmatrix}$

- a. F
- b. A
- c. B
- d. E
- e. D
- f. C

The correct answer is:
B

Question 6
Not answered
Marked out of 0.60

If $6\begin{bmatrix} 3 & 2 & -4 \\ 0 & z & \frac{x}{6} \end{bmatrix} = \begin{bmatrix} x & 4z & -y \\ 0 & y-6 & 18 \end{bmatrix}$, then:

a) $x = 3, y = 4, z = \frac{1}{2}$

b) $x = 18, y = 24, z = 3$

c) $x = 3, y = 4, z = 3$

d) $x = 6, y = 24, z = 6$

e) $x = 9, y = 4, z = 3$

f) The given matrix has no solution.

- a. E
- b. A
- c. D
- d. C
- e. F
- f. B

The correct answer is:
B

Question 7
Not answered
Marked out of 0.60

What is the first row of C^{-1} if $C = \begin{bmatrix} 1 & 0 & 3 & 0 \\ 0 & 2 & -3 & 6 \\ 0 & 5 & 0 & -2 \\ 2 & 1 & 6 & 0 \end{bmatrix}$?

a) $[35 \quad 1 \quad 3 \quad -17]$ b) $[17 \quad 5 \quad 6 \quad 19]$ c) $[33 \quad 1 \quad 3 \quad 17]$
d) $\left[11 \quad \frac{1}{3} \quad 1 \quad 6\right]$ e) $[0 \quad 1 \quad 3 \quad 9]$ f) C is not invertible

- a. E
- b. F
- c. C
- d. D
- e. A
- f. B

The correct answer is:
A

Question 8
Not answered
Marked out of 0.60

Let $A = \begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 2 & 7 \end{bmatrix}$, $C = \begin{bmatrix} 4 & -6 \\ 2 & 1 \end{bmatrix}$, and X be such that $AXB = C$. The second row of the matrix X is

a) $\left[\frac{-2}{3} \quad \frac{4}{3}\right]$ b) $[-8 \quad 4]$ c) $\left[\frac{-8}{3} \quad \frac{4}{3}\right]$
d) $\left[\frac{4}{3} \quad \frac{8}{3}\right]$ e) $\left[\frac{8}{3} \quad \frac{-4}{3}\right]$ f) $\left[\frac{4}{3} \quad \frac{-8}{3}\right]$

- a. A
- b. C
- c. D
- d. F
- e. E
- f. B

The correct answer is:
C

Question 9
Not answered
Marked out of 0.60

Let $T : \mathbb{R}^2 \to \mathbb{R}^2$ be a linear transformation, and assume that $T\begin{bmatrix}1\\2\end{bmatrix} = \begin{bmatrix}-1\\1\end{bmatrix}$ and $T\begin{bmatrix}0\\3\end{bmatrix} = \begin{bmatrix}-3\\3\end{bmatrix}$. Find the matrix of T and compute $T\begin{bmatrix}11\\-5\end{bmatrix}$:

a) $\begin{bmatrix}1 & -1\\-1 & 1\end{bmatrix}, 16\begin{bmatrix}1\\-1\end{bmatrix}$ b) $\begin{bmatrix}-1 & 1\\1 & -1\end{bmatrix}, \begin{bmatrix}-16\\16\end{bmatrix}$ c) $\begin{bmatrix}1 & 1\\1 & 1\end{bmatrix}, \begin{bmatrix}6\\6\end{bmatrix}$ d) $\begin{bmatrix}\sqrt{2} & -\sqrt{2}\\-\sqrt{2} & \sqrt{2}\end{bmatrix}, \begin{bmatrix}16\sqrt{2}\\-16\sqrt{2}\end{bmatrix}$

- a. A
- b. B
- c. C
- d. F
- e. E
- f. D

The correct answer is:
A

Question 10
Not answered
Marked out of 0.60

Given $A = \begin{bmatrix}1 & -2 & 0 & 4\\0 & 1 & 1 & 0\\0 & 1 & 2 & 2\\0 & 0 & 0 & 1\end{bmatrix}$, examine the propositions:

(i) A is in row-echelon form but not in reduced row-echelon form.

(ii) A^{-1} exists. If $A^{-1} = [b_{ij}]$ then $b_{12} = 4$.

(iii) The system $AX = 0$ admits only the trivial solution.

a) All three propositions are false.
b) Only (i) and (ii) are true.
c) Only (iii) is true.
d) Only (ii) and (iii) are true.
e) Only (i) is true.
f) All three propositions are true.

- a. C
- b. B
- c. D
- d. A
- e. E
- f. F

The correct answer is:
D

Question **11**
Not answered
Marked out of 0.60

Find $A^TA - (AA^T)I_3$ if $A = (1, 1, 1)$

a) $\begin{bmatrix} -2 & -2 & -2 \\ -2 & -2 & -2 \\ -2 & -2 & -2 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ c) $\begin{bmatrix} -2 & 1 & 1 \\ 1 & -2 & 1 \\ 1 & 1 & -2 \end{bmatrix}$

d) $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ e) $\begin{bmatrix} -2 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -2 \end{bmatrix}$ f) 0

- a. A
- b. C
- c. E
- d. F
- e. B
- f. D

The correct answer is:
C

Question 12
Not answered
Marked out of 0.60

Let $A = \begin{bmatrix} 1 & 2 & 2 \\ 1 & 3 & 1 \\ 1 & 3 & 2 \end{bmatrix}$. Then the second column of A^{-1} is

a) $[0 \quad -1 \quad 1]^T$ b) $[2 \quad 0 \quad -1]^T$ c) $[0 \quad 1 \quad -1]^T$
d) $[1 \quad -2 \quad 1]^T$ e) $[1 \quad -1 \quad 0]^T$ f) $[0 \quad 2 \quad -1]^T$

a. B
b. D
c. A
d. F
e. C
f. E

The correct answer is:
B

Question 13
Not answered
Marked out of 0.60

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

a) $[0 \quad 1 \quad -1]$ b) $[-1 \quad 1 \quad 0]$ c) $[0 \quad -1 \quad 1]$
d) $[1 \quad -1 \quad 0]$ e) $[1 \quad 0 \quad -1]$ f) none of the above

a. B
b. A
c. E
d. C
e. D
f. F

The correct answer is:
A

Question **14**

Not answered

Marked out of 0.60

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 $AB - BA$?

a) 3 b) 2 c) 1 d) 0 e) -1 f) -4

- a. C
- b. B
- c. A
- d. F
- e. D
- f. E

The correct answer is:
F

Question **15**

Not answered

Marked out of 0.60

If three $n \times n$ matrices A, B and C satisfy $AB - BA = C$, then ABA is:

a) $A^2B - C$ b) $A^2B - CA$ c) $BA^2 + CA$

d) A^2B e) $A^2B + AC$ f) $A^2B + BC$

- a. D
- b. B
- c. C
- d. E
- e. F
- f. A

The correct answer is:
C

Question 16
Not answered
Marked out of 0.60

Let A be the 2×2 matrix such that $A\begin{bmatrix}1\\0\end{bmatrix} = \begin{bmatrix}-5\\3\end{bmatrix}$ and $A\begin{bmatrix}0\\1\end{bmatrix} = \begin{bmatrix}2\\1\end{bmatrix}$. Compute A^2.

a) $\begin{bmatrix}25 & 4\\9 & 1\end{bmatrix}$ b) $\begin{bmatrix}-10 & 4\\6 & 2\end{bmatrix}$ c) $\begin{bmatrix}29 & -13\\-13 & 10\end{bmatrix}$

d) $\begin{bmatrix}30 & -8\\-12 & 7\end{bmatrix}$ e) $\begin{bmatrix}19 & 8\\-12 & 5\end{bmatrix}$ f) $\begin{bmatrix}31 & -8\\-12 & 7\end{bmatrix}$

- a. D
- b. A
- c. F
- d. E
- e. B
- f. C

The correct answer is:
F

Question 17
Not answered
Marked out of 0.60

Find the main diagonal of the inverse of $A = \begin{bmatrix}1 & -2 & -3\\-2 & 2 & 4\\-3 & 0 & 2\end{bmatrix}$.

a) $(2, \frac{-7}{2}, -1)$ b) $(\frac{5}{2}, \frac{7}{2}, \frac{3}{2})$ c) $(2, 1, -1)$

d) $(-1, \frac{-7}{2}, 3)$ e) $(\frac{7}{2}, 2, -1)$ f) $(2, 1, \frac{-7}{2})$

- a. C
- b. F
- c. E
- d. B
- e. D
- f. A

The correct answer is:
A

«