

Exercises 1.3 & 1.4

MATH 244
LINEAR ALGEBRA

FAHD ALSHAMMARI

If $A = \begin{bmatrix} 2 & 4 & 6 \\ 8 & 5 & 3 \end{bmatrix}$, the order of matrix A is

a) 3×2

b) 2×3

c) 1×3

d) 3×1

★ Multiple Choice

Let $A = \begin{pmatrix} 2 & 3 \\ 4 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 0 \\ 5 & 2 \end{pmatrix}$. Find $A + B$.

A) $\begin{pmatrix} 3 & 3 \\ 9 & 3 \end{pmatrix}$

B) $\begin{pmatrix} 3 & 3 \\ 4 & 1 \end{pmatrix}$

C) $\begin{pmatrix} 2 & 3 \\ 9 & 3 \end{pmatrix}$

D) $\begin{pmatrix} 3 & 3 \\ 9 & 3 \end{pmatrix}$

★ Multiple Choice

If $X = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $Y = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, find $3X - 2Y$.

A. $\begin{bmatrix} 1 - a & 2 - b \\ 3 - c & 4 - d \end{bmatrix}$

B. $\begin{bmatrix} 3 - 2a & 2 - b \\ 3 - c & 4 - d \end{bmatrix}$

C. $\begin{bmatrix} 3 - 2a & 6 - 2b \\ 9 - 2c & 12 - 2d \end{bmatrix}$

D. $\begin{bmatrix} a + 2c & b + 2d \\ 3a + 4c & 3b + 4d \end{bmatrix}$



Multiple Choice

If A is a 2×2 matrix and B is a 2×3 matrix, what is the size of the product AB ?

(A) 2×2

(B) 2×3

(C) 3×2

(D) 3×3

 Multiple Choice

If $X = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $Y = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, find the product XY .

A. $\begin{bmatrix} a & 2b \\ 3c & 4d \end{bmatrix}$

B. $\begin{bmatrix} a & 2c \\ 3b & 4d \end{bmatrix}$

C. $\begin{bmatrix} 3 - 2a & 6 - 2b \\ 9 - 2c & 12 - 2d \end{bmatrix}$

D. $\begin{bmatrix} a + 2c & b + 2d \\ 3a + 4c & 3b + 4d \end{bmatrix}$

 Multiple Choice

What is the result of multiplying the matrix $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$ by itself (i.e., A^2)?

- A) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
- B) $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$
- C) $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$
- D) $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$

★ Multiple Choice

What is the transpose of the matrix $D = \begin{pmatrix} 3 & 7 \\ 1 & 5 \end{pmatrix}$?

- A) $\begin{pmatrix} 3 & 1 \\ 7 & 5 \end{pmatrix}$
- B) $\begin{pmatrix} 3 & 7 \\ 1 & 5 \end{pmatrix}$
- C) $\begin{pmatrix} 7 & 3 \\ 5 & 1 \end{pmatrix}$
- D) $\begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix}$

★ Multiple Choice

What is the inverse of $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, if it exists?

A) $\begin{pmatrix} -2 & 1 \\ 1.5 & -0.5 \end{pmatrix}$

B) $\begin{pmatrix} -2 & 1 \\ 3 & -1 \end{pmatrix}$

C) $\begin{pmatrix} 2 & -1 \\ -1.5 & 0.5 \end{pmatrix}$

D) $\begin{pmatrix} 2 & -1 \\ 1.5 & -0.5 \end{pmatrix}$



Multiple Choice

Which of the following matrices is singular?

- A) $\begin{pmatrix} 2 & 5 \\ 7 & 3 \end{pmatrix}$

- B) $\begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$

- C) $\begin{pmatrix} 4 & 1 \\ 3 & 5 \end{pmatrix}$

- D) $\begin{pmatrix} 6 & 1 \\ 2 & 7 \end{pmatrix}$

 Multiple Choice

If A is an $n \times n$ matrix such that $A^2 = I$, which of the following must be true?

(A) $A = I$

(B) $A = -I$

(C) A is invertible

(D) None of the above



Multiple Choice

True or False?

Let A and B be 2×2 -matrices. If $AB = 0$ then $A = 0$ or $B = 0$.

A) True.

B) False.



Multiple Choice

True or False?

If A and B are $n \times n$ matrices, and $A^2 = B^2$, then $A = B$ or $A = -B$.

A) True.

B) False.



Multiple Choice

True or False?

For any $n \times n$ matrices A and B , if A is invertible, then $(AB)^2 = A^2B^2$.

A) True.

B) False.



Multiple Choice

True or False?

If A is a square matrix and $A^2 = A$, then A must be the identity.

A) True.

B) False.



Multiple Choice

True or False?

If A is an invertible matrix and $A^2 = A$, then A must be the identity.

A) True.

B) False.



Multiple Choice

True or False?

If A is not invertible and $A^2 = A$, then A must be the zero matrix.

A) True.

B) False.



Multiple Choice

True or False?

If A is an $n \times n$ matrix and $A^T = -A$, then $\text{trace}(A) = 0$.

A) True.

B) False.



Multiple Choice

True or False?

If A is an $n \times n$ matrix with $A^2 = -I$, where I is the identity matrix, then A is invertible.

A) True.

B) False.

 Multiple Choice

True or False?

If $A + A^2 = I$ then A must be invertible.

A) True.

B) False.



Multiple Choice

True or False?

If A and B are invertible $n \times n$ matrices, then $(A + B)$ is also invertible.

A) True.

B) False.



Multiple Choice

True or False?

If A is an $n \times n$ matrix such that $A^2 = 0$ (the zero matrix), then $(I - A)^{-1} = I + A$.

A) True.

B) False.



Multiple Choice

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19
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