MATHS

BOOKS - NIKITA MATHS (HINGLISH)

MATRICES

Multiple Choice Questions

1. Matrix theory was introduced by

A. Euclid

B. Chauchy

C. Newton

D. Caykey-Hailton

Answer: D

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2. A square matrix $A=[a_{ij}]$ in which $a_{ij}=0$ for $i \neq j$ and $[a]_{ij}=k$ (constant) for $i=j$ is called a

A. unit matrix

B. null matrix

C. scalar matrix

D. diagonal matrix

Answer: C

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3. Choose the correct answer

A. Every identity matrix is scalar matrix

B. Every scalar matrix is and identity matrix

C. Every diagonal matrix is an identity matrix

D. A square matrix whose each element is 1 is an identity matrix

Answer: A

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4. Square matrix $\left[a_{ij}\right]_{n \times m}$ will be an upper triangular matrix, if

A. $a_{ij} = 0$, for $i < j$

B. $a_{ij} = 0$, for $i > j$

C. $a_{ij} = !0$, for $i < j$

D. $a_{ij} = !0$, for $i > j$

Answer: B

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5. In a upper triangular matrix $n \times n$, minimum number of zeros is

A. $\frac{n(n+1)}{2}$

B. $\frac{n(n-1)}{2}$

C. $\frac{n(2n-1)}{2}$

D. $\frac{n(n-1)}{4}$

Answer: B

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6. In a skew-symmetrix matrix, the diagonal elements are all

A. one

B. zero

C. different from each other

D. non-zero

Answer: B

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7. If A is a square matrix for which $a_{ij} = i^2 - j^2$, then matrix A is

A. unit

B. zero

C. symmetric

D. skew-symmetric

Answer: D

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8. Which of the following is not true?

A. Adjoint of a diagonal matrix is diagonal

B. Adjoint of symmetric matrix is symmetric

C. If determinant of a square matrix is non-zero, then it is non-singular

D. Every skew-symmetric matrix of odd order is non-singular

Answer: D

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9. Which one of the following is correct?

A. Skew-symmetric matrix of odd order is singular

B. Skew-symmetric matrix of odd order is non-singular

C. Skew-symmetric matrix of even order is always singular

D. Adjoint of diagonal matrix is a non-diagonal matrix

Answer: A

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10. If A is square matrix, $A + A^T$ is symmetric matrix, then $A - A^T$=

A. zero matrix

B. unit matrix

C. symmetric matrix

D. skew-symmetric matric

Answer: D

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11. If A^T is a skew-symmetric matrix and n is a positive integer, then A^n is

A. diagonal matrix

B. a symmetric matrix

C. skew-symmetric matrix

D. either symmetric or skew-symmetric matrix

Answer: D

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12. If I is unit matrix of order n, then 3I will be

A. a unit matrix

B. a scalar matrix

C. a triangular matrix

D. a zero matrix

Answer: B

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13. If A is a square matrix of order n then $|kA| =$

A. $K|A|$

B. $k^n|A|$

C. $k^{-n}|A|$

D. $|A|$

Answer: B

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14. If A and B are square matrices of same order, then

A. $A - B = B - A$

B. A+B=B-A

C. $A + B = B + A$

D. $AB = BA$

Answer: C

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15. If two matrices A and B are of order $p \times q$ and $r \times s$ respectively,then they can be subtracted only if

A. $p = r, q = s$

B. $p = q, r = s$

C. $p = q$

D. $p \neq r, q \neq s$

Answer: A

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16. Matrix A is of order $m \times n$, matrix B is of order $p \times q$ such that AB exists, then

A. $m = n$

B. $p = n$

C. $m = q$

D. $p = q$

Answer: B

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17. If A and B are two matrices such that A+B and AB are both defined, then

A. A and B are square matrices of same order

B. number of column of A =number of rows of B

C. A and B are two matrices not necessarily of same order

D. A and B are any matrices

Answer: A

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18. If A is a $m \times n$ matrix and B is a matrix such that both AB and BA are defined, then the order of B is

A. $m \times m$

B. $n \times n$

C. $m \times n$

D. $n \times m$

Answer: D

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19. Which one of the following is not true?

A. Matrix addition is associative

B. Matrix addition is commutative

C. Matrix multiplication is associative

D. Matrix multiplication is commutative

Answer: D

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20. Which is true about matrix multiplication?

A. It is associative

B. It is commutative

C. It is not associative

D. It have inverse

Answer: A

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21. The matrix product AB=0, then

A. $A = 0 \text{ or } B = 0$

B. $A=0, B=0$

C. A is null matrix

D. None of these

Answer: D

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22. Assuming that the sums and products given below are defined, which of the following is not true for matrices

A. $(AB)' = B'A'$

B. $A+B=B+A$

C. $AB=0 \Rightarrow A=0, B=0$

D. AC=AB does not imlpy B=C

Answer: C

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23. If A, B are square matrices of order 3, A is non-singular and AB=0, then B is a

A. null matrix

B. unit matrix

C. singular matrix

D. non-singular matrix

Answer: A

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24. If A andB are square matrices of order 2, then $(A+B)^2$=

A. $A^2+2AB+B^2$

B. $A^2+2BA+B^2$

C. $A^2+AB+BA+B^2$

D. $A^2 + B^2$

Answer: C

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25. If A and B are square matrices of order $n \times n$, then $(A - B)^2 =$

A. $A^2 - B^2$

B. $A^2 + 2AB + B^2$

C. $A^2 - 2AB + B^2$

D. $A^2 - AB - BA + B^2$

Answer: D

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26. If A, B are two matrices and $(A + B)(A - B) = A^2 - B^2$, then

A. $AB = BA$

B. $A'B' = AB$

C. $A^2 + B^2 = A^2 - B^2$

D. $AB \neq BA$

Answer: A

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27. Which of the following is incorrect?

A. $\left(A^T\right)^T = A$

B. $A^2 - B^2 = (A + B)(A - B)$

C. $(A - I)(I + A) = O \Rightarrow A^2 = I$

D. $(AB)^n = A^n B^n$, where A, B commute

Answer: B

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28. If A^T, B^T are transpose of the square matrices A, B respectively, then $(AB)^T =$

A. AB^T

B. BA^T

C. A^TB^T

D. B^TA^T

Answer: D

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29. Which of the following relations is incorrect?

A. $(A')' = A$

B. $(kA') = kA'$

C. $(AB...I) = A'B'...I'$

D. $(A + B + \ldots + I) = (A' + B' + \ldots + I')$

Answer: C

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30. Which one of the following statements is true?

A. If A'=A, then A is a square matrix

B. Determinant of a non-singular matrix is zero

C. Non-singular square matrix does not have a unique inverse

D. If $|A| = !0$ then $|AadjA| = |A|^{n-1}$, where A is a square matrix of order n

Answer: A

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31. If $A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$ and A_{ij} denote the cofactor of element a_{ij}, then $a_{11}A_{21} + a_{12}A_{22} + a_{13}A_{23} =$

A. 0

B. $|A|$

C. $-|A|$

D. $2|A|$

Answer: A

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32. If $A = \begin{bmatrix} 1 & 1 & 0 \\ 2 & 1 & 5 \\ 1 & 2 & 1 \end{bmatrix}$ and a_{ij} denote the cofactor of element A_{ij}, then $a_{11}A_{21} + a_{21}A_{22} + a_{13}A_{23} =$

A. 1

B. 0

C. -1

D. 2

Answer: A

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33. If $A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$ and a_{ij} denote the cofactor of element A_{ij}, then $a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13} =$

A. 0

B. $|A|$

C. $-|A|$

D. $2|A|$

Answer: B

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34. If A and B are non-singular square matrices of same order then $adj(AB)$ is equal to

A. $(adjA)(adjB)$

B. $(adjB)(adjA)$

C. $\left(adjA^{-1}\right)\left(adjB^{-1}\right)$

D. $\left(adjB^{-1}\right)\left(adjA^{-1}\right)$

Answer: B

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35. If A is a non-singular matrix of order n, then $A(adjA) =$

A. A

B. I

C. $|A|I_n$

D. $|A|^2 I_n$

Answer: C

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36. If A is a singular matrix of order n, then $A(adjA) =$

A. 0

B. A

C. I

D. $|A|I_n$

Answer: A

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37. If A is a $n \times n$ matrix and $|A| \neq 0$, then $adj(adjA) =$

A. $|A|^{n-1}A$

B. $|A|^{n-2}A$

C. $|A|^{n}A$

D. $|A|^{2}$

Answer: B

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38. If A is a singular matrix of order n, then $(adjA)$ is

A. symmetric

B. singular

C. non-singular

D. not defined

Answer: B

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39. If A is a square matrix, then $adj(A') - (adjA)' =$

A. I

B. 0

C. $2(adjA)$

D. $2(adjA')$

Answer: B

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40. If A is a non-singular matrix of order 3, $(adjA) + A^{-1} = 0,$ then $|A| =$

A. 0

B. 1

C. -1

D. 2

Answer: C

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41. If A is a non-singular matrix of order 3, then $\left|adjA^3\right| =$

A. $|A|^9$

B. $|A|^{12}$

C. $|A|^3$

D. $|A|^6$

Answer: D

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42. If D is the determinant of a square matrix A of order n, then the determinant of its adjoint is

A. D

B. D^{n-1}

C. D^{n}

D. D^{n+1}

Answer: B

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43. Which of the following is/are incorrect? (i).Adjoint of symmetric matrix is symmetric (ii).Adjoint of unit matrix is a unit matrix (iii). $A(adjA)=(adjA)A=!|A|I$ (iv). Adjoint of a diagonal matrix is a diagonal matrix

A. (i)

B. (ii)

C. (iii)

D. (iv)

Answer: D

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44. The inverse of a matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is

A. $\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

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

C. $\frac{1}{|A|}\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

D. $\frac{1}{ad - bc}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

Answer: D

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45. If A and B are non-singular matrices, then

A. $AB = BA$

B. $(AB)' = A'B'$

C. $(AB)^{-1} = B^{-1}A^{-1}$

D. $(AB)^{-1} = A^{-1}B^{-1}$

Answer: C

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46. If A, B, C are invertible matrices, then $(ABC)^{-1}$=

A. $A^{-1}B^{-1}C^{-1}$

B. $C^{-1}A^{-1}B^{-1}$

C. $B^{-1}C^{-1}A^{-1}$

D. $C^{-1}B^{-1}A^{-1}$

Answer: D

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47. If

$D = diag(d_1, d_2, d_3, \ldots, d_n)$ where $d \neq 0$ for all $I = 1, 2, \ldots, n,$ then is equal to

A. $diag\left[d_1^{-1}, d_2^{-1}, \ldots, d_n^{-1}\right]$

B. I_n

C. D

D. $-diag\left[d_1^{-1}, d_2^{-1}, \ldots, d_n^{-1}\right]$

Answer: A

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48. The inverse of a summetric matrix is

A. diagonal matrix

B. skew-symmetric matrix

C. symmetric matrix

D. not symmetric matrix

Answer: C

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49. If I_3 is identity matrix of order 3, then $I_3^{-1} =$

A. 0

B. I_3

C. $3I_3$

D. does not exist

Answer: B

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50. The matrix having the same matrix as its inverse

A. $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$

Answer: C

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51. Let A be a square matrix all of whose entries are integers. Then which one of the following is true?

A. If det A $= \pm 1$, then A^{-1} need not exist

B. If det A $= \pm 1$, then A^{-1} exists and all entries are integers

C. If det A $= \pm 1$, then A^{-1} exist and all its entries are non-integers

D. If det A $= \pm 1$, then A^{-1} exist but all its entries are not necessarily integers

Answer: B

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52. If $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$, then $A^5 =$

A. $32A$

B. $16A$

C. $10A$

D. $5A$

Answer: B

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53. If $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$, then $A^6 =$

A. $6A$

B. $12A$

C. $16A$

D. $32A$

Answer: D

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54. If A and B are 3×3 matrices such that AB=A and BA=B, then

A. $A^2 = A \text{ and } B^2 = B$

B. $A^2 = A \text{ and } B^2 = !B$

C. $A^2 = !A \text{ and } B^2 = B$

D. $A^2 = !A \text{ and } B^2 = !B$

Answer: A

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55. If A is a square matrix such that $A^2 = A,$ then $(I - A)^2 + A =$

A. I

B. A

C. $3A$

D. $I - A$

Answer: A

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56. If A, B, c are three square matrices such that AB=AC implies B=C, then the matrix is always a/an

A. diagonal matrix

B. orthogonal matrix

C. singular matrix

D. non-singular matrix

Answer: D

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57. If A and B are two n-rowed square matrices such that AB=O and B is non-singular. Then

A. $A = I$

B. $A = 0$

C. $A \neq 0$

D. $A = nI$

Answer: B

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58. The number of 3 3 non-singular matrices, with four entries as 1 and all other entries as 0, is (1) 5 (2) 6 (3) at least 7 (4) less than 4

A. 6

B. 5

C. less then 4

D. atleast7

Answer: D

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59. $\cos\theta\begin{bmatrix}\cos\theta & \sin\theta \\ -\sin\theta & \cos\theta\end{bmatrix}+\sin\theta\begin{bmatrix}\sin\theta & -\cos\theta \\ \cos\theta & \sin\theta\end{bmatrix}=$

A. $\begin{bmatrix}0 & 0 \\ 0 & 0\end{bmatrix}$

B. $\begin{bmatrix}0 & 1 \\ 1 & 0\end{bmatrix}$

C. $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Answer: D

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60. If $[m, n]\begin{bmatrix} m \\ n \end{bmatrix} = [25]$ and (m, n)

A. $(2, 3)$

B. $(3, 4)$

C. $(4, 3)$

D. $(3, 2)$

Answer: B

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61. If matrix $A = \begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$ then

A. $A' = \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$

B. $A\begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} = 2I$

C. $A^{-1} = \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix}$

D. $\lambda A = \begin{bmatrix} \lambda & -\lambda \\ 1 & -1 \end{bmatrix}$, where λ is a non-zero scalar

Answer: B

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62. If $A = \begin{bmatrix} 4 & -1 \\ -1 & k \end{bmatrix}$ such that $A^2 - 6A + 7I = 0$ and $k =$

A. 1

B. 3

C. 2

D. 4

Answer: C

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63. Let $A = \begin{bmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{bmatrix}$. The only correct statement aboul the matrix A is

A. $A^2 = I$

B. A is a zero matrix

C. A^{-1} does not exist

D. A=(-1)I, where I is a unit matrix

Answer: A

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64. If $M = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$, then $M^{50} =$

A. -1

B. 0

C. 1

D. $3^{49}M$

Answer: D

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65. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, then $A^{10} =$

A. $\begin{bmatrix} \cos 10\alpha & -\sin 10\alpha \\ \sin 10\alpha & \cos 10\alpha \end{bmatrix}$

B. $\begin{bmatrix} \cos 10\alpha & \sin 10\alpha \\ -\sin 10\alpha & \cos 10\alpha \end{bmatrix}$

C. $\begin{bmatrix} \cos 10\alpha & \sin 10\alpha \\ -\sin 10\alpha & -\cos 10\alpha \end{bmatrix}$

D. $\begin{bmatrix} \cos 10\alpha & -\sin 10\alpha \\ -\sin 10\alpha & -\cos 10\alpha \end{bmatrix}$

Answer: B

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66. If A is a square matrix, then $A + A^T$ is

A. unit matrix

B. symmetric matrix

C. non-singular matrix

D. skew-symmetric matrix

Answer: B

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67. For any square matrix A, AA^T is a

A. unit matrix

B. diagonal matrix

C. symmetric matrix

D. skew-symmetrix matrix

Answer: C

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68. Let A be a square matrix. Then which of the following is not a symmetric matrix -

A. $A + A'$

B. $A - A'$

C. $A'A$

D. AA'

Answer: B

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69. If A is a square matrix, A' its transpose, then $\frac{1}{2}(A - A')$ is .... Matrix

A. a unit

B. an elementry

C. a symmetric

D. a skew-symmetric

Answer: D

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70. If A and B are symmetric matrices of same order, then which one of the following is not true

A. A+B is symmetric

B. A-B is symmetric

C. AB+BA is symmetric

D. AB-BA is symmetric

Answer: D

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71. If A is a square matrix of order n and $|A| = D, |adjA| = D'$, then

A. $DD' = D^2$

B. $DD' = D^n$

C. $DD' = D^{n-1}$

D. $DD' = 2D^n$

Answer: B

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72. If adj$B = A, |P| = |Q| = 1, thenadj\left(Q^{-1}BP^{-1}\right)$ is PQ b. QAP c. PAQ d. PA^1Q

A. PQ

B. QPA

C. PAQ

D. $PA^{-1}Q$

Answer: C

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73. Let A, B and C be $n \times n$ matrices, which one of the following is a correct statement

A. If $A^2 = 0$, then A=0

B. If AB=AC, then B=C

C. If $A^3 + 2A^2 + 3A + 5I = 0$, then A is invertible

D. If AB=AC, then B=C

Answer: C

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74. If $A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 5 \\ 2 & -5 & 0 \end{bmatrix}$, then

A. $A' = -A$

B. $A' = A$

C. $A' = 2A$

D. $A' = -2A$

Answer: A

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75. If $A = \begin{bmatrix} 1 & 0 \\ -1 & 3 \end{bmatrix}$, then $R_1 \leftrightarrow R_2$ on A gives

A. $\begin{bmatrix} -1 & 3 \\ 1 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -1 \\ 0 & 3 \end{bmatrix}$

C. $\begin{bmatrix} 0 & 1 \\ 3 & -1 \end{bmatrix}$

D. $\begin{bmatrix} 3 & 0 \\ 1 & 1 \end{bmatrix}$

Answer: A

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76. If $A = \begin{bmatrix} 3 & 1 \\ 4 & 5 \end{bmatrix}$, then $R_1 \leftrightarrow R_2$ on A gives

A. $\begin{bmatrix} 3 & 4 \\ 1 & 5 \end{bmatrix}$

B. $\begin{bmatrix} 4 & 5 \\ 3 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 3 \\ 5 & 4 \end{bmatrix}$

D. $\begin{bmatrix} 5 & -1 \\ -4 & 3 \end{bmatrix}$

Answer: B

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77. If $A = \begin{bmatrix} 5 & 4 \\ 1 & 3 \end{bmatrix}$, then $C_1 \leftrightarrow C_2$ on A gives

A. $\begin{bmatrix} 5 & 1 \\ 4 & 3 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 3 \\ 5 & 4 \end{bmatrix}$

C. $\begin{bmatrix} 4 & 5 \\ 3 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 3 & -4 \\ -1 & 5 \end{bmatrix}$

Answer: C

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78. If $A = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 4 & 5 \end{bmatrix}$, then $3R_1$ on A gives

A. $\begin{bmatrix} 1 & 0 & -6 \\ 2 & 4 & -15 \end{bmatrix}$

B. $\begin{bmatrix} 3 & 0 & 6 \\ 2 & 4 & 5 \end{bmatrix}$

C. $\begin{bmatrix} -1 & 0 & -2 \\ 6 & 12 & 15 \end{bmatrix}$

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

Answer: B

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79. If $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 3 \end{bmatrix}$, then $2C_2$ on A gives

A. $\begin{bmatrix} 1 & 4 & -1 \\ 0 & 2 & 3 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 2 & -1 \\ 0 & 2 & 6 \end{bmatrix}$

C. $\begin{bmatrix} 1 & -4 & -1 \\ 0 & -2 & 3 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 2 & -1 \\ 0 & -2 & -6 \end{bmatrix}$

Answer: A

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80. If $A = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 3 \end{bmatrix}$, then the addition of matrices obtained by $-3R_1$ on A and $2C_2$ on B gives.

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

B. $\begin{bmatrix} -2 & 4 & -7 \\ 2 & 5 & 4 \end{bmatrix}$

C. $\begin{bmatrix} 2 & -1 & 3 \\ -3 & 5 & 4 \end{bmatrix}$

D. $\begin{bmatrix} 1 & -1 & 3 \\ 1 & 6 & 1 \end{bmatrix}$

Answer: B

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81. If $A = \begin{bmatrix} 1 & -1 & 3 \\ 2 & 3 & 4 \end{bmatrix}$, then $R_1 \rightarrow R_1 - R_2$ on A gives

A. $\begin{bmatrix} 3 & 4 & 7 \\ 2 & 5 & 3 \end{bmatrix}$

B. $\begin{bmatrix} -1 & -6 & -1 \\ 2 & 5 & 4 \end{bmatrix}$

C. $\begin{bmatrix} 2 & -1 & 3 \\ -3 & 5 & 4 \end{bmatrix}$

D. $\begin{bmatrix} 1 & -1 & 3 \\ 1 & 6 & 1 \end{bmatrix}$

Answer: B

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82. If $A = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 3 & 4 \end{bmatrix}$, then $C_1 \rightarrow C_1 + C_3$ on A gives

A. $\begin{bmatrix} 1 & 0 & 2 \\ 8 & 3 & 4 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 0 & 2 \\ 11 & 3 & 4 \end{bmatrix}$

C. $\begin{bmatrix} 5 & 0 & 2 \\ 10 & 3 & 4 \end{bmatrix}$

D. $\begin{bmatrix} -3 & 0 & 2 \\ -6 & 3 & 4 \end{bmatrix}$

Answer: C

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83. If $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & -2 & 5 \end{bmatrix}$, then first $R_1 \leftrightarrow R_2$ and then $C_1 \rightarrow C_1 + 2C_3$ on A gives

A. $\begin{bmatrix} -1 & 2 & -1 \\ 13 & -2 & 5 \end{bmatrix}$

B. $\begin{bmatrix} 3 & -2 & 5 \\ 1 & 2 & -1 \end{bmatrix}$

C. $\begin{bmatrix} -1 & 2 & -1 \\ 13 & -2 & 5 \end{bmatrix}$

D. $\begin{bmatrix} 13 & -2 & 5 \\ -1 & 2 & -1 \end{bmatrix}$

Answer: D

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84. If $A = = \begin{bmatrix} 1 & -1 & 3 \\ 2 & 1 & 0 \\ 3 & 3 & 1 \end{bmatrix}$, then first $3R_3$ and then $C_3 \rightarrow C_3 + 2C_2$ on A gives

A. $\begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & 2 \\ 9 & 9 & 21 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -1 & 3 \\ 2 & 1 & 0 \\ 9 & 9 & 3 \end{bmatrix}$

C. $\begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & 2 \\ 3 & 3 & 7 \end{bmatrix}$

D. $\begin{bmatrix} 1 & -1 & 6 \\ 2 & 1 & 3 \\ 3 & 3 & 12 \end{bmatrix}$

Answer: A

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85. The co-factor of -4 and 9 in $\begin{bmatrix} -1 & -2 & 3 \\ -4 & -5 & -6 \\ -7 & 8 & 9 \end{bmatrix}$ are respectively.

A. $-42, 3$

B. $42, \ -3$

C. $-42, \ -3$

D. $42, 3$

Answer: B

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86. The co-factor of elements of the second row of $\begin{bmatrix} 1 & 2 & 3 \\ -4 & 3 & 6 \\ 2 & -7 & -39 \end{bmatrix}$ are

A. $4, 5, 6$

B. $-3, 11, -39$

C. $11, 3, -39$

D. $57, -45, 11$

Answer: D

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87. If $A = \begin{bmatrix} 5 & 6 & 3 \\ -4 & 3 & 2 \\ -4 & -7 & 3 \end{bmatrix}$, then co-factor of the elements of second row are

A. $39, -3, 11$

B. $-39, 3, 11$

C. $-39, 27, 11$

D. $-39, -3, 11$

Answer: C

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88. The co-factors of the elements of second row of the $\begin{bmatrix} 1 & 3 & -2 \\ 4 & -5 & 6 \\ 3 & 5 & 2 \end{bmatrix}$ are

A. $-16, \ -8, \ -4$

B. $-16, 8, 4$

C. $16, \ -8, 4$

D. $-16, 8, \ -4$

Answer: B

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89. The co-factors of the elements of third row of $\begin{bmatrix} 1 & -1 & 2 \\ 3 & 1 & 4 \\ 1 & 2 & 3 \end{bmatrix}$ are

A. $-6, 2, 4$

B. $6, \ -2, 3$

C. $-6, 1, 3$

D. $3, 2, \ -6$

Answer: A

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90. The co-factors of the elements of the first column of $\begin{bmatrix} 1 & 1 & -2 \\ 2 & 3 & -5 \\ 4 & -1 & -3 \end{bmatrix}$ are

A. $14, \ -5, 3$

B. $-14, 3, \ -6$

C. $-14, 5, 1$

D. $5, \ -3, \ -2$

Answer: C

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91. The co-factors of the elements of third column of $\begin{bmatrix} 4 & 3 & 1 \\ 1 & 3 & 2 \\ 2 & 1 & 5 \end{bmatrix}$ are

A. $5, 3, 1$

B. $-5, 2, 7$

C. $-5, 2, 9$

D. $2, 3, 9$

Answer: C

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92. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 2 \\ 1 & 2 & 2 \end{bmatrix}$, then

A. $A_{12} + A_{22} + A_{32} = 0$

B. $A_{13} + A_{23} + A_{33} = 1$

C. $A_{11} + A_{21} = A_{32}$

D. $A_{11} + A_{21} = 2A_{32}$

Answer: C

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93. Matrix of co-factors of the matrix $\begin{bmatrix} -1 & 2 \\ -3 & 4 \end{bmatrix}$ is

A. $\begin{bmatrix} 4 & 2 \\ -3 & -1 \end{bmatrix}$

B. $\begin{bmatrix} 4 & -2 \\ 3 & -1 \end{bmatrix}$

C. $\begin{bmatrix} 4 & -3 \\ 2 & -1 \end{bmatrix}$

D. $\begin{bmatrix} 4 & 3 \\ -2 & -2 \end{bmatrix}$

Answer: D

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94. Matrix of co-factors of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ is

A. $\begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 4 & -3 \\ -2 & 1 \end{bmatrix}$

C. $\begin{bmatrix} -4 & 2 \\ 3 & -1 \end{bmatrix}$

D. $\begin{bmatrix} -4 & 3 \\ 2 & -1 \end{bmatrix}$

Answer: B

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95. Matrix of co-factors of the matrix $\begin{bmatrix} 1 & 3 \\ 4 & -1 \end{bmatrix}$ is

A. $\begin{bmatrix} -1 & -4 \\ -3 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -4 \\ -3 & -1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & -4 \\ -3 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -1 & 3 \\ 4 & 1 \end{bmatrix}$

Answer: A

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96. Matrix of co-factors of the matrix $\begin{bmatrix} 1 & -1 & 2 \\ -2 & 3 & 5 \\ -2 & 0 & -1 \end{bmatrix}$ is

A. $\begin{bmatrix} -3 & 12 & 6 \\ 1 & 3 & -2 \\ -11 & 9 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -3 & -12 & 6 \\ -1 & 3 & -1 \\ -11 & -9 & 1 \end{bmatrix}$

C. $\begin{bmatrix} -3 & -1 & -11 \\ -12 & 3 & -9 \\ 6 & 2 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -3 & -12 & 6 \\ -1 & 3 & 2 \\ -11 & -9 & 1 \end{bmatrix}$

Answer: D

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97. Matrix of co-factors of the matrix $\begin{bmatrix} 1 & 0 & 2 \\ -2 & 1 & 3 \\ 0 & 3 & -5 \end{bmatrix}$ is

A. $\begin{bmatrix} -14 & -10 & 6 \\ 6 & -5 & -3 \\ -2 & -7 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -14 & -10 & -6 \\ -6 & 5 & -3 \\ -2 & -7 & -1 \end{bmatrix}$

C. $\begin{bmatrix} -14 & -10 & -6 \\ 6 & -5 & -3 \\ -2 & -7 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -14 & -10 & -6 \\ 6 & -5 & -1 \\ 2 & -7 & -1 \end{bmatrix}$

Answer: C

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98. If $A = \begin{bmatrix} 2 & 1 \\ 4 & 2 \end{bmatrix}$, then

A. A is non-singular

B. A^{-1} does not exist

C. A^{-1} exist

D. $A^{-1} = 2A$

Answer: B

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99. If $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then

A. A is invertible

B. A is not invertible

C. A is singular

D. A is zero matrix

Answer: A

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100. If $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then

A. A is identity matrix

B. A is non-singular

C. A is invertible

D. A is not invertible

Answer: D

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101. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 3 \end{bmatrix}$, then

A. A is singular

B. A^{-1} exists

C. A^{-1} does not exists

D. A^{-1} is not singular

Answer: B

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102. If $A = \begin{bmatrix} 2 & 3 \\ 10 & 15 \end{bmatrix}$, then

A. A is non-singular

B. A^{-1} exists

C. A^{-1} does not exists

D. 2A is non-singular

Answer: C

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103. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then

A. A is singular

B. A^{-1} exists

C. A^{-1} does not exists

D. A^{-1} is singular

Answer: B

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104. If $A = \begin{bmatrix} \sec\theta & \tan\theta \\ \tan\theta & \sec\theta \end{bmatrix}$, then

A. A is scalar matrix

B. A is singular

C. A is not invertible

D. A is invertible

Answer: D

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105. If $A = \begin{bmatrix} 1 & 3 & 2 \\ 3 & 1 & 2 \\ 1 & 2 & 3 \end{bmatrix}$, then

A. A^{-1} exists

B. A^{-1} does not exists

C. A is singular

D. A is null matrix

Answer: A

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106. If $A = \begin{bmatrix} 3 & 4 & 3 \\ 1 & 1 & 0 \\ 1 & 4 & 5 \end{bmatrix}$, then

A. A is singular

B. A is lower triangular matrix

C. A is invertible

D. A is not invertible

Answer: C

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107. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 3 \\ 1 & 2 & 3 \end{bmatrix}$, then

A. A is not invertible

B. A is invertible

C. A is non-singular

D. $AA^{-1} = 1$

Answer: A

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108. If $A=\begin{bmatrix}1 & 2 & 3\\ 3 & 4 & 5\\ 4 & 6 & 8\end{bmatrix}$, then

A. A is non-singular

B. A^{-1} does not exists

C. A^{-1} exists

D. $AA^{-1}=1$

Answer: B

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109. If $\begin{bmatrix}\sin\left(\frac{\pi}{2}\right) & \cos\left(\frac{\pi}{3}\right)\\ 2\tan\left(\frac{\pi}{4}\right) & 2k\end{bmatrix}$ is not invertible, then k=

A. 2

B. $\frac{1}{2}$

C. 1

D. 3

Answer: B

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110. The matrix $\begin{bmatrix} \lambda & -1 & 4 \\ -3 & 0 & 2 \\ -1 & 1 & 2 \end{bmatrix}$ is invertible, if

A. $\lambda \neq -18$

B. $\lambda \neq -17$

C. $\lambda \neq -8$

D. $\lambda \neq -15$

Answer: C

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111. The matrix $\begin{bmatrix} 1 & a & 2 \\ 1 & 2 & 5 \\ 2 & 1 & 1 \end{bmatrix}$ is not invertible, if a=

A. -1

B. 0

C. 1

D. 2

Answer: B

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112. If the inverse of $\begin{bmatrix} 1 & 2 & x \\ 4 & -1 & 7 \\ 2 & 4 & -6 \end{bmatrix}$ does not exist, then x=

A. 3

B. -3

C. 0

D. 2

Answer: C

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113. If $\begin{bmatrix} x & 1 & 1 \\ 2 & 3 & 4 \\ 1 & 1 & 1 \end{bmatrix}$ has no inverse, then x=

A. -4

B. -2

C. 1

D. -3

Answer: D

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114. Matrix $A = \begin{bmatrix} 1 & 0 & -k \\ 2 & 1 & 3 \\ k & 0 & 1 \end{bmatrix}$ is invertible for

A. $k = -1$

B. $k = 0$

C. $k = 1$

D. all real k

Answer: D

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115. If k is a scalar and I is unit matrix of order 3, then $adj(kI) =$

A. $-k^3 I$

B. $-k^2 I$

C. $k^2 I$

D. $k^3 I$

Answer: A

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116. If $a = \begin{bmatrix} -2 & 6 \\ -5 & 7 \end{bmatrix}$, then adjA=

A. $\begin{bmatrix} 7 & -6 \\ 5 & -2 \end{bmatrix}$

B. $\begin{bmatrix} 7 & -5 \\ 6 & -2 \end{bmatrix}$

C. $\begin{bmatrix} 2 & -6 \\ 5 & -7 \end{bmatrix}$

D. $\begin{bmatrix} -2 & 6 \\ -5 & 7 \end{bmatrix}$

Answer: D

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117. If $A = \begin{bmatrix} 2 & -3 \\ 3 & 5 \end{bmatrix}$, then adjA=

A. $\begin{bmatrix} -5 & -3 \\ 3 & -2 \end{bmatrix}$

B. $\begin{bmatrix} -5 & 3 \\ -3 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 5 & -3 \\ 3 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 5 & 3 \\ -3 & 2 \end{bmatrix}$

Answer: D

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118. If $A = \begin{bmatrix} 2 & -3 \\ 4 & 1 \end{bmatrix}$, then adjA=

A. $\begin{bmatrix} 1 & -3 \\ 4 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -3 \\ -4 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 3 \\ -4 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 1 & -4 \\ 3 & 2 \end{bmatrix}$

Answer: C

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119. If $A = \begin{bmatrix} 4 & 2 \\ 3 & 4 \end{bmatrix}$, then |adjA|=

A. 6

B. 10

C. 16

D. -10

Answer: B

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120. If $X = \begin{bmatrix} -x & -y \\ z & t \end{bmatrix}$, then transpose of adjX is

A. $\begin{bmatrix} t & z \\ -y & -x \end{bmatrix}$

B. $\begin{bmatrix} t & -z \\ y & -x \end{bmatrix}$

C. $\begin{bmatrix} t & y \\ -z & -x \end{bmatrix}$

D. $\begin{bmatrix} -x & -y \\ z & t \end{bmatrix}$

Answer: B

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121. Adjoint of the matrix $N = \begin{bmatrix} -4 & -3 & -3 \\ 1 & 0 & 1 \\ 4 & 4 & 3 \end{bmatrix}$ is

A. $-N$

B. N

C. $2N$

D. $-2N$

Answer: D

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122. If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$, then adjA=

A. A

B. A'

C. 3A

D. 3A'

Answer: A

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123. If $A = \begin{bmatrix} 3 & 5 & -1 \\ 2 & 0 & 4 \\ 1 & -3 & 0 \end{bmatrix}$, then $\begin{bmatrix} 12 & 4 & -6 \\ 3 & 1 & 14 \\ 20 & -14 & -10 \end{bmatrix}$ is

A. adj(A')

B. $-(adj(A))$

C. $adjA$

D. $-A^{-1}$

Answer: A

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124. If $A = \begin{bmatrix} 1 & -1 & 2 \\ -2 & 3 & 5 \\ -2 & 0 & -1 \end{bmatrix}$, then adjA=

A. $\begin{bmatrix} -3 & -1 & -11 \\ -12 & 3 & -9 \\ 6 & 2 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -3 & -12 & 6 \\ -1 & 3 & 2 \\ -11 & -9 & 1 \end{bmatrix}$

C. $\begin{bmatrix} -3 & -1 & -11 \\ 12 & 3 & -9 \\ 6 & 2 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -3 & -1 & 11 \\ -12 & 2 & 9 \\ 6 & 2 & 1 \end{bmatrix}$

Answer: A

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125. If $A = \begin{bmatrix} 2 & 0 & -1 \\ 3 & 1 & 2 \\ -1 & 1 & 2 \end{bmatrix}$, then adjA=

A. $\begin{bmatrix} 0 & -8 & 4 \\ -1 & 3 & -2 \\ 1 & -7 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 0 & -1 & 1 \\ 8 & 2 & -7 \\ 4 & -2 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 0 & -1 & 1 \\ -8 & 3 & -7 \\ 4 & -2 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 0 & -1 & -1 \\ -8 & 3 & -7 \\ 4 & -2 & 2 \end{bmatrix}$

Answer: C

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126. If $A = [5a - b32]$ and A adj $A = \forall^T$, then $5a + b$ is equal to: (1) -1 (2) 5 (3) 4 (4) 13

A. -1

B. 5

C. 4

D. 13

Answer: B

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127. If the adjoint of a 3 3 matrix P is 1 4 4 2 1 7 1 1 3 , then the possible value(s) of the determinant of P is (are) (A) 2 (B) 1 (C) 1 (D) 2

A. ± 2

B. -1

C. 1

D. 0

Answer: A

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128. $A = \begin{bmatrix} 1 & 0 & 2 \\ -1 & 1 & -2 \\ 0 & 2 & 1 \end{bmatrix}$ and $adjA = \begin{bmatrix} 5 & x & -2 \\ 1 & 1 & 0 \\ -2 & -2 & y \end{bmatrix}$, then (x, y)=

A. $(4, \ -1)$

B. $(-4, 1)$

C. $(-4, \ -10)$

D. $(4, 1)$

Answer: D

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129. If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and $kA' = adjA,$ then k=

A. 2

B. 3

C. -2

D. -3

Answer: B

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130. If A is a unit matrix of order n, then A(adjA) is

A. row matrix

B. zero matrix

C. unit matrix

D. not unit matrix

Answer: C

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131. If $A = \begin{bmatrix} 3 & 4 \\ 5 & 7 \end{bmatrix}$, then A(adjA)=

A. $|A|I$

B. $|A|$

C. I

D. $2I$

Answer: A

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132. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then A(adjA)=kI, then k=

A. 2

B. -2

C. 10

D. -10

Answer: B

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133. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$ and $A(adjA) = \begin{bmatrix} k & 0 \\ 0 & k \end{bmatrix}$, then k=

A. $\sin\alpha\cos\alpha$

B. $\cos 2\alpha$

C. 0

D. 1

Answer: D

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134. For a invertible matrix A, if $A(adjA) = \begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$, then $|A| =$

A. 100

B. -100

C. 10

D. -10

Answer: C

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135. If $A = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & -2 \\ 1 & 0 & 3 \end{bmatrix}$, then (adjA)A=

A. $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 7 & 0 & 0 \\ 0 & 7 & 0 \\ 0 & 0 & 7 \end{bmatrix}$

C. $\begin{bmatrix} -7 & 0 & 0 \\ 0 & -7 & 0 \\ 0 & 0 & -7 \end{bmatrix}$

D. $\begin{bmatrix} 11 & 0 & 0 \\ 0 & 11 & 0 \\ 0 & 0 & 11 \end{bmatrix}$

Answer: D

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136. If $A = \begin{bmatrix} 1 & -2 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$, then A(adjA)=

A. $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$

C. $\begin{bmatrix} 8 & 0 & 0 \\ 0 & 8 & 0 \\ 0 & 0 & 8 \end{bmatrix}$

D. $\begin{bmatrix} 5 & 1 & 1 \\ 1 & 5 & 1 \\ 1 & 1 & 5 \end{bmatrix}$

Answer: C

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137. If A is a square matrix of order 2×2 and $|A| = 5,$ then $|A(adjA)|$=

A. 5

B. 20

C. 25

D. 30

Answer: C

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138. If A is a square matrix of order n, where $|A| = 5$ and $|A(adj A)| = 125$, then n=

A. 3

B. 2

C. 1

D. 4

Answer: A

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139. If A is a non-singular matrix of order 3, then adj(adj(A)) is equal to

A. A

B. A^{-1}

C. $|A|A$

D. $\frac{1}{|A|}A^{-1}$

Answer: C

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140. If $A=\begin{bmatrix}2 & -1 & 1\\ 1 & 2 & 1\\ -1 & 1 & 3\end{bmatrix}$, then |adj(adjA)|=

A. 17^2

B. 17^3

C. 17^5

D. 17^4

Answer: D

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141. If $A = \begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & -3 \\ 2 & 1 & 0 \end{bmatrix}$ and $B = (adjA)$ and $C = 5A$, then find the value of $\frac{|adjB|}{|C|}$

A. -1

B. 1

C. 5

D. 25

Answer: B

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142. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 9 \\ 1 & 8 & 27 \end{bmatrix}$, then the value of $|adjA|$ is

A. 144

B. 72

C. 36

D. 18

Answer: A

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143. If $P = \begin{bmatrix} 1 & \alpha & 3 \\ 1 & 3 & 3 \\ 2 & 4 & 4 \end{bmatrix}$ is the adjoint of 3×3 matrix A and $|A| = 4$, then $\alpha =$

A. 0

B. 4

C. 5

D. 11

Answer: D

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144. If A is a matrix of order 3 and $|A| = 8$, then $|adjA| =$

A. 1

B. 2

C. 2^3

D. 2^6

Answer: D

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145. For a 3×3 matrix A if $|A| = 4, then|Adj. A|$ is (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

A. -4

B. 4

C. 16

D. 64

Answer: C

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146. If A is a square matrix of order 3 and $|adjA| = 25$, then $|A| =$

A. 25

B. -25

C. ± 5

D. 625

Answer: C

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147. If A is a square matrix of order 3 such that A^{-1} exists, then $|adjA| =$

A. $|A|$

B. $|A|^2$

C. $|A|^3$

D. $|A|^4$

Answer: B

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148. If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$, then $|adjA| =$

A. a^3

B. a^6

C. a^9

D. a^{27}

Answer: B

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149. If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$, then $|A||adjA| =$

A. a^3

B. a^6

C. a^9

D. a^{27}

Answer: C

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150. If $A = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$, then $|A||adj A| =$

A. 3^3

B. 3^6

C. 3^9

D. 3^{27}

Answer: C

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151. If A is a square matrix of order 3 and $|A| = -2$, then the value of the determinant $|A||adj A|$ is

A. 8

B. -8

C. -1

D. -32

Answer: B

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152. If $A = \begin{bmatrix} 0 & 1 & -1 \\ 2 & 1 & 3 \\ 3 & 2 & 1 \end{bmatrix}$, then $\left(A(adjA)A^{-1}\right)A =$

A. $2\begin{bmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$

B. $\begin{bmatrix} -6 & 0 & 0 \\ 0 & -6 & 0 \\ 0 & 0 & -6 \end{bmatrix}$

C. $\frac{1}{6}\begin{bmatrix} 0 & 1 & -1 \\ 2 & 1 & 3 \\ 3 & 2 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$

Answer: A

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153. If for the matrix A, $A^3 = I$, then $A^{-1} =$

A. A

B. A^2

C. A^3

D. $-A^3$

Answer: A

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154. If for the matrix A, $A^5 = I$, then $A^{-1} =$

A. A^2

B. A^3

C. A

D. A^4

Answer: D

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155. If A and B are square matrices of the same order and $AB = 3I$, then $A^{-1} =$

A. $3B$

B. $3B^{-1}$

C. $\frac{1}{3}B$

D. $\frac{1}{3}B^{-1}$

Answer: C

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156. If $A^2 - A + I = 0$, then $A^{-1} =$

A. A^{-2}

B. $I - A$

C. $A - I$

D. $A + I$

Answer: B

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157. If A is a square matrix satisfying the equation $A^2 - 4A - 5I = 0$, then $A^{-1} =$

A. $\frac{1}{5}(A + 4I)$

B. $\frac{1}{5}(A - 4I)$

C. $\frac{1}{5}(I - 4A)$

D. $\frac{1}{5}(I + 4A)$

Answer: B

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158. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ and $A^2 - 5A + 7I = 0$, then $I =$

A. $\frac{1}{5}(A) + \frac{7}{5}(A^{-1})$

B. $\frac{1}{7}(A) + \frac{5}{7}(A^{-1})$

C. $\frac{1}{7}(A) - \frac{5}{7}(A^{-1})$

D. $\frac{1}{5}(A) - \frac{7}{5}(A^{-1})$

Answer: A

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159. If A is non-singular and $(A - 2I)(A - 4I) = 0$, then $\frac{1}{6}(A) + \frac{4}{3}(A^{-1}) =$

A. I

B. 0

C. $2I$

D. $6I$

Answer: A

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160. If a matrix A is such that $3A^3 + 2A^2 + 5A + I = 0$, then its inverse is

A. $3A^2 - 2A - 5I$

B. $3A^2 + 2A + 5I$

C. $-(3A^2 + 2A + 5I)$

D. $3A^2 - 2A + 5I$

Answer: C

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161. If A is a non-singular matrix, such that $I+A+A^2+\ldots+A^n=0$, then $A^{-1}=$

A. A^n

B. $-A^n$

C. $-\left(I+A+A^2+\ldots+A^n\right)$

D. A^2

Answer: A

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162. If A is an $3x3$ non-singular matrix such that $\forall' - A'AandB = A^{-1}A'$, then BB' equals: B^{-1} (b) $\left(B^{-1}\right)'$ (c) $I+B$ (d) I

A. $I+B$

B. I

C. B^{-1}

D. $B^{-1}{}'$

Answer: B

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163. If A and B are two square matrices such that $B = -A^{-1}BA$, then $(A+B)^2$ is equal to

A. 0

B. $A+B$

C. A^2+B^2

D. $A^2+2AB+B^2$

Answer: C

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164. If A and B are square matrices of the same order such that $(A+B)(A-B)=A^2-B^2$ then $(ABA^{-1})^2$ is equal to

A. I

B. A^2

C. B^2

D. A^2B^2

Answer: C

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165. For a square matrix A and a non-singular matrix B, of the same order, the value of $|B^{-1}AB| =$

A. $|A|$

B. $|A^{-1}|$

C. $|B|$

D. $\left|B^{-1}\right|$

Answer: A

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166. If $A=\begin{bmatrix}0&3\\2&0\end{bmatrix}$ and $A^{-1}=\lambda(adjA)$, then $\lambda=$

A. $-\frac{1}{6}$

B. $-\frac{1}{3}$

C. $\frac{1}{3}$

D. $\frac{1}{6}$

Answer: A

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167. If $A=\begin{bmatrix}x&-2\\3&7\end{bmatrix}$ and $A^{-1}=\begin{bmatrix}\frac{7}{34}&\frac{1}{17}\\\frac{-3}{34}&\frac{2}{17}\end{bmatrix}$,then the value of x is

A. -4

B. 2

C. 3

D. 4

Answer: D

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168. If matrix $A = \begin{bmatrix} 3 & 2 & 4 \\ 1 & 2 & -1 \\ 0 & 1 & 1 \end{bmatrix}$ and $A^{-1} = \frac{1}{k}$ adj A, then k is

A. -7

B. $\frac{1}{7}$

C. 7

D. 11

Answer: D

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169. If $A^{-1} = \frac{1}{3}\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$ and $|A| = 3$, then adjA=

A. $\frac{1}{9}\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -2 & 1 \\ 4 & -5 & -2 \\ -2 & 4 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -1 & -4 & -2 \\ 2 & 5 & 4 \\ 1 & -4 & 1 \end{bmatrix}$

Answer: C

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170. If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then $(adjA)^{-1} =$

A. $\begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -\cos\alpha & \sin\alpha & 0 \\ \sin\alpha & -\cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} -\cos\alpha & \sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} \cos\alpha & \sin\alpha & 0 \\ -\sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Answer: A

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171. The element of second row and third column in the inverse of $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$ is

A. -2

B. -1

C. 1

D. 2

Answer: B

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172. The element of second row and third column in the inverse of $\begin{bmatrix} 1 & 2 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$ is

A. -2

B. 0

C. 1

D. 7

Answer: A

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173. Let $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$ and $10B = \begin{bmatrix} 4 & 2 & 2 \\ -5 & 0 & \alpha \\ 1 & -2 & 3 \end{bmatrix}$. If B is the inverse of A, then α is :

A. -2

B. -1

C. 2

D. 5

Answer: D

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174. If matrix $A = \begin{bmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & 6 & 7 \end{bmatrix}$ and its inverse is denoted by $A^{-1} = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$, then the value of a_{23}=

A. $\frac{-2}{3}$

B. $\frac{1}{5}$

C. $\frac{2}{5}$

D. $\frac{21}{20}$

Answer: C

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175. If $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & a & 1 \end{bmatrix}$ and $A^{-1} = \frac{-1}{2}\begin{bmatrix} -1 & 1 & -1 \\ 8 & -6 & -2k \\ -5 & 3 & -1 \end{bmatrix}$, then

A. $a = -1, k = 1$

B. $a = 1, k = -1$

C. $a = 2, k = \frac{-1}{2}$

D. $a = \frac{1}{2}, k = \frac{1}{2}$

Answer: B

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176. If the inverse of $\begin{bmatrix} 2 & -1 & 4 \\ 4 & -3 & 1 \\ 1 & 2 & 1 \end{bmatrix}$ is $\frac{1}{37}\begin{bmatrix} -5 & 9 & 11 \\ -3 & -2 & 14 \\ 11 & -5 & k \end{bmatrix}$, then k=

A. 2

B. 3

C. -2

D. -3

Answer: D

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177. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then $|A^{-1}| =$

A. 1

B. -1

C. 2

D. 4

Answer: A

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178. If $A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$, then $\left|A^{-1}\right| =$

A. 1

B. -1

C. 0

D. 2

Answer: B

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179. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 3 & 4 & 3 \end{bmatrix}$, then $|A^{-1}| =$

A. $\frac{1}{4}$

B. $\frac{-1}{4}$

C. 4

D. -4

Answer: B

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180. If A is square matrix of order 3, $|A| = 1000$ and $|kA^{-1}| = 27$, then k is

A. 20

B. 40

C. 30

D. 9

Answer: C

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181. If $A = \begin{bmatrix} 4 & 5 \\ 2 & 5 \end{bmatrix}$, then $|2A^{-1}| =$

A. $\frac{1}{30}$

B. $\frac{1}{20}$

C. $\frac{1}{60}$

D. $\frac{2}{5}$

Answer: D

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182. If $A = \begin{bmatrix} 2x & 0 \\ x & x \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix}$ then x equals to

A. 1

B. 2

C. $\frac{1}{2}$

D. $\frac{1}{3}$

Answer: C

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183. If $A^{-1} = \frac{-1}{2}\begin{bmatrix}1 & -4 \\ -1 & 2\end{bmatrix}$, then A=

A. $\begin{bmatrix}2 & 4 \\ 1 & 1\end{bmatrix}$

B. $\begin{bmatrix}1 & -4 \\ -1 & 2\end{bmatrix}$

C. $\begin{bmatrix}2 & 4 \\ -1 & 1\end{bmatrix}$

D. $\begin{bmatrix}1 & 1 \\ 4 & 2\end{bmatrix}$

Answer: A

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184. If $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then

A. $A^{-1} = B$

B. B^{-1} exists

C. A^{-1} does not exists

D. A^{-1} exists

Answer: C

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185. If the multiplicative group of 2×2 matrices of the form $\begin{bmatrix} a & a \\ a & a \end{bmatrix}$, for $a \neq 0$ and $a \in R$, then the inverse of $\begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}$ is

A. $\begin{bmatrix} \frac{1}{2} & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$

B. $\begin{bmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{bmatrix}$

C. $\begin{bmatrix} \frac{1}{8} & \frac{1}{8} \\ \frac{1}{8} & \frac{1}{8} \end{bmatrix}$

D. does not exist

Answer: D

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186. The inverse of matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ is

A. $\frac{-1}{2}\begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

B. $\frac{1}{2}\begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}$

C. $\frac{-1}{2}\begin{bmatrix} 4 & -3 \\ 3 & 1 \end{bmatrix}$

D. $\frac{1}{2}\begin{bmatrix} 4 & -3 \\ -2 & 1 \end{bmatrix}$

Answer: A

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187. The inverse of matrix $\begin{bmatrix} 3 & -10 \\ 2 & -7 \end{bmatrix}$ is

A. $-\begin{bmatrix} -7 & -2 \\ 10 & 3 \end{bmatrix}$

B. $\begin{bmatrix} -7 & -2 \\ 10 & 3 \end{bmatrix}$

C. $-\begin{bmatrix} -7 & 10 \\ -2 & 3 \end{bmatrix}$

D. $\begin{bmatrix} -7 & 10 \\ -2 & 3 \end{bmatrix}$

Answer: C

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188. The inverse of matrix $\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$ is

A. $-\begin{bmatrix} 4 & 1 \\ 7 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 4 & 1 \\ 7 & 2 \end{bmatrix}$

C. $-\begin{bmatrix} 4 & -1 \\ -7 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 4 & -1 \\ -7 & 2 \end{bmatrix}$

Answer: D

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189. The inverse of matrix $\begin{bmatrix} 2 & -3 \\ 5 & 7 \end{bmatrix}$ is

A. $\frac{-1}{29}\begin{bmatrix} 7 & 3 \\ -5 & 2 \end{bmatrix}$

B. $\frac{1}{29}\begin{bmatrix} 7 & 3 \\ -5 & 2 \end{bmatrix}$

C. $-\begin{bmatrix} 7 & 3 \\ -5 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 7 & 3 \\ -5 & 2 \end{bmatrix}$

Answer: B

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190. The inverse of matrix $\begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$ is

A. $\begin{bmatrix} 7 & -3 \\ -2 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -7 & 3 \\ 2 & -1 \end{bmatrix}$

C. $\begin{bmatrix} 7 & -2 \\ -3 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -7 & 2 \\ 3 & -1 \end{bmatrix}$

Answer: A

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191. The inverse of matrix $\begin{bmatrix} 2 & 1 \\ 1 & -1 \end{bmatrix}$ is

A. $-\begin{bmatrix} 1 & 1 \\ 1 & -2 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 1 \\ 1 & -2 \end{bmatrix}$

C. $\frac{-1}{3}\begin{bmatrix} 1 & 1 \\ 1 & -2 \end{bmatrix}$

D. $\frac{1}{3}\begin{bmatrix} 1 & 1 \\ 1 & -2 \end{bmatrix}$

Answer: D

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192. The inverse of matrix $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ is

A. $\frac{1}{5}\begin{bmatrix} 3 & -1 \\ -2 & 1 \end{bmatrix}$

B. $\frac{1}{5}\begin{bmatrix} 3 & 1 \\ -2 & 1 \end{bmatrix}$

C. $\frac{1}{5}\begin{bmatrix} -3 & 1 \\ -2 & 1 \end{bmatrix}$

D. $\frac{1}{5}\begin{bmatrix} 3 & -1 \\ 2 & -1 \end{bmatrix}$

Answer: B

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193. The inverse of matrix $\begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$ is

A. $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$

B. $-\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$

D. $-\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$

Answer: C

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194. The inverse of matrix $\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ is

A. $\frac{-1}{5}\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$

B. $\frac{1}{5}\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$

C. $\frac{-1}{5}\begin{bmatrix} -1 & 2 \\ 2 & 1 \end{bmatrix}$

D. $\frac{1}{5}\begin{bmatrix} -1 & -2 \\ -2 & 1 \end{bmatrix}$

Answer: B

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195. The inverse of matrix $\begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix}$ is

A. $\frac{1}{14}\begin{bmatrix} 3 & -2 \\ 4 & 2 \end{bmatrix}$

B. $\frac{-1}{2}\begin{bmatrix}3 & 2\\ -4 & 2\end{bmatrix}$

C. $\frac{1}{14}\begin{bmatrix}3 & 2\\ -4 & 2\end{bmatrix}$

D. $\frac{1}{2}\begin{bmatrix}3 & 2\\ -4 & 2\end{bmatrix}$

Answer: C

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196. The inverse of matrix $\begin{bmatrix}-1 & 5\\ -3 & 2\end{bmatrix}$ is

A. $\frac{1}{13}\begin{bmatrix}2 & -5\\ 3 & -1\end{bmatrix}$

B. $\frac{1}{13}\begin{bmatrix}-1 & 5\\ -3 & 2\end{bmatrix}$

C. $\frac{1}{13}\begin{bmatrix}-1 & -3\\ 5 & 2\end{bmatrix}$

D. $\frac{1}{13}\begin{bmatrix}1 & 5\\ 3 & -2\end{bmatrix}$

Answer: A

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197. If $A = \begin{bmatrix} 5 & 4 \\ 3 & 2 \end{bmatrix}$, then $A^{-1} =$

A. $\frac{1}{2}\begin{bmatrix} -2 & 4 \\ 3 & 5 \end{bmatrix}$

B. $\frac{-1}{2}\begin{bmatrix} 2 & -4 \\ -3 & 5 \end{bmatrix}$

C. $\frac{1}{2}\begin{bmatrix} -4 & 4 \\ -3 & 5 \end{bmatrix}$

D. $\frac{1}{2}\begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$

Answer: B

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198. If $A = \begin{bmatrix} 5 & 4 \\ 4 & 3 \end{bmatrix}$, then $A^{-1} =$

A. $\frac{1}{2}\begin{bmatrix} -4 & 4 \\ -3 & 5 \end{bmatrix}$

B. $\begin{bmatrix} 3 & 4 \\ 4 & 5 \end{bmatrix}$

C. $\begin{bmatrix} -3 & 4 \\ 4 & -5 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 2 \\ -3 & 2 \end{bmatrix}$

Answer: C

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199. The inverse of matrix $A = \begin{bmatrix} 2 & -3 \\ -4 & 2 \end{bmatrix}$ is

A. $\frac{-1}{8}\begin{bmatrix} 2 & 3 \\ 4 & 2 \end{bmatrix}$

B. $\frac{1}{8}\begin{bmatrix} 2 & 3 \\ 4 & 2 \end{bmatrix}$

C. $\frac{-1}{8}\begin{bmatrix} 3 & 2 \\ 2 & 4 \end{bmatrix}$

D. $\frac{1}{8}\begin{bmatrix} 3 & 2 \\ 2 & 4 \end{bmatrix}$

Answer: A

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200. The inverse of matrix $\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$ is

A. $\begin{bmatrix} 4 & -7 \\ 7 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 4 & -1 \\ -7 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 4 & -1 \\ -7 & -2 \end{bmatrix}$

D. $\begin{bmatrix} -4 & -1 \\ 7 & -2 \end{bmatrix}$

Answer: B

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201. if $A = [a_{ij}]_{2 \cdot 2}$ where $a_{ij} = \{i + j, i \neq j$ and $a_{ij} = i^2 - 2j, i = j$ then A^{-1} is equal to

A. $\frac{1}{9}\begin{bmatrix} 0 & 3 \\ 3 & 0 \end{bmatrix}$

B. $\frac{1}{2}\begin{bmatrix} 0 & -3 \\ -3 & -1 \end{bmatrix}$

C. $\frac{1}{9}\begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$

D. $\frac{-1}{9}\begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$

Answer: A

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202. If $A=\begin{bmatrix} i & 0 \\ 0 & \frac{i}{2} \end{bmatrix}$, then $A^{-1}=$

A. $\begin{bmatrix} i & 0 \\ 0 & \frac{i}{2} \end{bmatrix}$

B. $\begin{bmatrix} i & 0 \\ 0 & 2i \end{bmatrix}$

C. $\begin{bmatrix} -i & 0 \\ 0 & -2i \end{bmatrix}$

D. $\begin{bmatrix} 0 & i \\ 2i & 0 \end{bmatrix}$

Answer: C

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203. If $A=\begin{bmatrix} a+ib & c+id \\ -c+id & a-ib \end{bmatrix}$ and $a^2+b^2+c^2+d^2=1$, then A^{-1} is equal to

A. $\begin{bmatrix} a+ib & -c+id \\ c+id & a-ib \end{bmatrix}$

B. $\begin{bmatrix} a-ib & -c+id \\ c+id & a+ib \end{bmatrix}$

C. $\begin{bmatrix} a-ib & c-id \\ c-id & a+ib \end{bmatrix}$

D. $-\begin{bmatrix} a-ib & c-id \\ c-id & a+ib \end{bmatrix}$

Answer: C

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204. The inverse of the matrix $\begin{bmatrix} \sec\theta & \tan\theta \\ \tan\theta & \sec\theta \end{bmatrix}$ is

A. $\begin{bmatrix} \sec\theta & \tan\theta \\ \tan\theta & -\sec\theta \end{bmatrix}$

B. $\begin{bmatrix} -\sec\theta & \tan\theta \\ \tan\theta & \sec\theta \end{bmatrix}$

C. $\begin{bmatrix} \sec\theta & -\tan\theta \\ -\tan\theta & \sec\theta \end{bmatrix}$

D. $\begin{bmatrix} -\sec\theta & -\tan\theta \\ \tan\theta & -\sec\theta \end{bmatrix}$

Answer: C

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205. The inverse of the matrix $\begin{bmatrix} \cos ec\theta & -\cot\theta \\ -\cot\theta & \cos ec\theta \end{bmatrix}$ is

A. $\begin{bmatrix} \cos ec\theta & \cot\theta \\ \cot\theta & \cos ec\theta \end{bmatrix}$

B. $\begin{bmatrix} -\cos ec\theta & \cot\theta \\ \cot\theta & -\cos ec\theta \end{bmatrix}$

C. $\begin{bmatrix} \cos ec\theta & -\cot\theta \\ \cot\theta & -\cos ec\theta \end{bmatrix}$

D. $\begin{bmatrix} \cos ec\theta & -\cot\theta \\ \cot\theta & \cos ec\theta \end{bmatrix}$

Answer: A

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206. Inverse of the matrix $A = \begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix}$ is

A. $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix}$

B. $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

C. $\begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix}$

D. $\begin{bmatrix} \cos 2\theta & \sin 2\theta \\ \sin 2\theta & -\cos 2\theta \end{bmatrix}$

Answer: B

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207. If $A = \begin{bmatrix} 2 & -3 \\ 5 & -7 \end{bmatrix}$, then $A + A^{-1} =$

A. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} -5 & 0 \\ 0 & -5 \end{bmatrix}$

C. $\begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$

D. $\begin{bmatrix} 4 & 0 \\ 0 & -5 \end{bmatrix}$

Answer: B

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208. If $A = \begin{bmatrix} 3 & 2 \\ 0 & 1 \end{bmatrix}$, then $\left(A^{-1}\right)^3 =$

A. $\frac{1}{27}\begin{bmatrix} -1 & 26 \\ 0 & 27 \end{bmatrix}$

B. $\frac{1}{27}\begin{bmatrix} 1 & -26 \\ 0 & 27 \end{bmatrix}$

C. $\frac{1}{27}\begin{bmatrix} 1 & -26 \\ 0 & -27 \end{bmatrix}$

D. $\frac{1}{27}\begin{bmatrix} -1 & -26 \\ 0 & -27 \end{bmatrix}$

Answer: B

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209. If $A = \begin{bmatrix} 2 & -3 \\ -4 & 7 \end{bmatrix}$, then $2A^{-1} =$

A. $8I - 2A$

B. $9I - A$

C. $2I - 2A$

D. $A - 9I$

Answer: B

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210. If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$, then $A^{-1} =$

A. A^2

B. $\frac{1}{19}A$

C. $\frac{1}{17}A$

D. $\frac{1}{15}A$

Answer: B

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211. If $A = \begin{bmatrix} 1 & 3 \\ 0 & 3 \end{bmatrix}$, then $A^{-1} =$

A. $\frac{1}{3}(4I - A)$

B. $\frac{1}{3}(A - 4I)$

C. $4I - A$

D. $A - 4I$

Answer: A

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212. If $A = \begin{bmatrix} 4 & 5 \\ 2 & 1 \end{bmatrix}$, then

A. $6A^{-1} = A - 5I$

B. $6A^{-1} = 5I - A$

C. $6A^{-1} = A + 5I$

D. $6A^{-1} = A + 5I$

Answer: A

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213. If $A = \begin{bmatrix} 1 & 2 \\ -5 & 1 \end{bmatrix}$ and $A^{-1} = xA + yI$, then

A. $x = \dfrac{-1}{11}, y = \dfrac{-2}{11}$

B. $x = \frac{-1}{11}, y = \frac{2}{11}$

C. $x = \frac{1}{11}, y = \frac{-2}{11}$

D. $x = \frac{1}{11}, y = \frac{2}{11}$

Answer: B

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214. If $\begin{bmatrix} x & y^3 \\ 2 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 8 \\ 2 & 0 \end{bmatrix}$, then $\begin{bmatrix} x & y \\ 2 & 0 \end{bmatrix}^{-1} =$

A. $\begin{bmatrix} 0 & -2 \\ -2 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 0 & -8 \\ -2 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 0 & \frac{1}{2} \\ \frac{1}{2} & -\frac{1}{4} \end{bmatrix}$

Answer: D

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215. $\begin{bmatrix} 1 & -\tan\left(\frac{\theta}{2}\right) \\ \tan\left(\frac{\theta}{2}\right) & 1 \end{bmatrix}\begin{bmatrix} 1 & \tan\left(\frac{\theta}{2}\right) \\ -\tan\left(\frac{\theta}{2}\right) & 1 \end{bmatrix}^{-1} =$

A. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

C. $\begin{bmatrix} \cos\theta & \sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$

D. $\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$

Answer: D

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216. If $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix} A = I$, then A=

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

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

C. $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$

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

Answer: D

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217. If $A=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ and $AX=I$, then X=

A. $\begin{bmatrix}2 & -1\\ -3 & 1\end{bmatrix}$

B. $-\begin{bmatrix}2 & -1\\ -3 & 1\end{bmatrix}$

C. $\frac{1}{2}\begin{bmatrix}4 & -2\\ -3 & 1\end{bmatrix}$

D. $\frac{-1}{2}\begin{bmatrix}4 & -2\\ -3 & 1\end{bmatrix}$

Answer: D

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218. If matrix $A=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ such that AX=I , then X=

A. $\frac{1}{2}\begin{bmatrix}1 & 3\\ 2 & -1\end{bmatrix}$

B. $\frac{1}{2}\begin{bmatrix}4 & 2 \\ 4 & -1\end{bmatrix}$

C. $\frac{1}{2}\begin{bmatrix}-4 & 2 \\ 3 & -1\end{bmatrix}$

D. $\frac{1}{2}\begin{bmatrix}-1 & 2 \\ -1 & 4\end{bmatrix}$

Answer: C

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219. If $A = \begin{bmatrix}1 & \tan\left(\frac{\theta}{2}\right) \\ -\tan\left(\frac{\theta}{2}\right) & 1\end{bmatrix}$ and $AB = I$, then B=

A. $\cos^2\left(\frac{\theta}{2}\right)I$

B. $\cos^2\left(\frac{\theta}{2}\right)A$

C. $\cos^2\left(\frac{\theta}{2}\right)A^T$

D. $-\cos^2\left(\frac{\theta}{2}\right)A^T$

Answer: C

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220. If AX=B, where $A = \begin{bmatrix} -1 & 2 \\ 2 & -1 \end{bmatrix}$,$B = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$, then X=

A. $\begin{bmatrix} 5 & 7 \end{bmatrix}$

B. $\frac{1}{3}\begin{bmatrix} 5 & 7 \end{bmatrix}$

C. $\begin{bmatrix} 5 \\ 7 \end{bmatrix}$

D. $\frac{1}{3}\begin{bmatrix} 5 \\ 7 \end{bmatrix}$

Answer: D

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221. The matrix A satisfying $A\begin{bmatrix} 1 & 5 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 3 & -1 \\ 6 & 0 \end{bmatrix}$ is

A. $\begin{bmatrix} 6 & -6 \\ 12 & 4 \end{bmatrix}$

B. $\begin{bmatrix} 3 & -16 \\ 6 & -30 \end{bmatrix}$

C. $\begin{bmatrix} 9 & -16 \\ 36 & -45 \end{bmatrix}$

D. $\begin{bmatrix} 9 & 4 \\ 36 & 4 \end{bmatrix}$

Answer: B

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222. If $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}, B = \begin{bmatrix} 0 & 1 \\ 2 & 4 \end{bmatrix}$ and $AX = B$, then X=

A. $\frac{-1}{5}\begin{bmatrix} -4 & -5 \\ 2 & 5 \end{bmatrix}$

B. $\frac{1}{5}\begin{bmatrix} -4 & -5 \\ 2 & 5 \end{bmatrix}$

C. $-\begin{bmatrix} -4 & -1 \\ 2 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -4 & -1 \\ 2 & 1 \end{bmatrix}$

Answer: B

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223. If $A = \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 1 \\ 3 & 1 \end{bmatrix}, C = \begin{bmatrix} 24 & 7 \\ 31 & 9 \end{bmatrix}$ and $AXB = C$, then X=

A. $-\begin{bmatrix} 1 & 3 \\ 1 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 3 \\ 1 & 2 \end{bmatrix}$

C. $-\begin{bmatrix} 2 & 3 \\ 1 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 2 & 3 \\ 1 & 1 \end{bmatrix}$

Answer: D

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224. If $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} A \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then A=

A. $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 0 & 1 \\ 1 & 1 \end{bmatrix}$

D. 0

Answer: A

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225. The inverse of the matrix $\begin{bmatrix} x & 0 & 0 \\ 0 & y & 0 \\ 0 & 0 & z \end{bmatrix}$ is

A. $\begin{bmatrix} \frac{1}{x} & 0 & 0 \\ 0 & \frac{1}{y} & 0 \\ 0 & 0 & \frac{1}{z} \end{bmatrix}$

B. $-\begin{bmatrix} \frac{1}{x} & 0 & 0 \\ 0 & \frac{1}{y} & 0 \\ 0 & 0 & \frac{1}{z} \end{bmatrix}$

C. $\begin{bmatrix} yz & 0 & 0 \\ 0 & zx & 0 \\ 0 & 0 & xy \end{bmatrix}$

D. $-\begin{bmatrix} yz & 0 & 0 \\ 0 & zx & 0 \\ 0 & 0 & xy \end{bmatrix}$

Answer: A

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226. The inverse of the matrix $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ is

A. $\begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

B. $\begin{bmatrix} -\frac{1}{2} & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} -1 & 0 & 0 \\ 0 & -\frac{1}{2} & 0 \\ 0 & 0 & \frac{1}{2} \end{bmatrix}$

D. $\frac{-1}{2}\begin{bmatrix} -\frac{1}{2} & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

Answer: A

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227. If $A = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then $A^{-1} =$

A. $2A$

B. A

C. $-A$

D. 1

Answer: B

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228. The inverse of $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ is

A. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

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

C. $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

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

Answer: C

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229. The inverse of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 3 & 1 \end{bmatrix}$ is

A. $-\begin{bmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 3 & -3 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 3 & -3 & 1 \end{bmatrix}$

C. $-\begin{bmatrix} 1 & -2 & 3 \\ 0 & 1 & -3 \\ 0 & 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 1 & -2 & 3 \\ 0 & 1 & -3 \\ 0 & 0 & 1 \end{bmatrix}$

Answer: B

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230. The inverse of the matrix $\begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ is

A. $\begin{bmatrix} -1 & 0 & 1 \\ 2 & -1 & 1 \\ 1 & -1 & -1 \end{bmatrix}$

B. $-\begin{bmatrix} -1 & 0 & 1 \\ 2 & -1 & 1 \\ 1 & -1 & -1 \end{bmatrix}$

C. $\begin{bmatrix} -1 & 2 & 1 \\ 0 & -1 & 1 \\ 1 & -1 & -1 \end{bmatrix}$

D. $-\begin{bmatrix} -1 & 2 & 1 \\ -1 & 1 & 0 \\ 1 & -1 & -1 \end{bmatrix}$

Answer: C

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231. The inverse of the matrix $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ is

A. $\begin{bmatrix} -7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 7 & 3 & 3 \\ -1 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

C. $\begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} -7 & 3 & 3 \\ -1 & 1 & 0 \\ 1 & 0 & -1 \end{bmatrix}$

Answer: C

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232. The inverse of the matrix $\begin{bmatrix} 3 & -2 & -1 \\ -4 & 1 & -1 \\ 2 & 0 & 1 \end{bmatrix}$ is

A. $\begin{bmatrix} 1 & 2 & 3 \\ 3 & 3 & 7 \\ -2 & -4 & -5 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix}$

C. $\begin{bmatrix} 1 & -3 & 5 \\ 7 & 4 & 6 \\ 4 & 2 & 7 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 2 & -4 \\ 8 & -4 & -5 \\ 3 & 5 & 2 \end{bmatrix}$

Answer: B

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233. The inverse of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 3 & 3 & 0 \\ 5 & 2 & -1 \end{bmatrix}$ is

A. $\frac{-1}{3}\begin{bmatrix} -3 & 0 & 0 \\ 3 & 1 & 0 \\ 9 & 2 & -3 \end{bmatrix}$

B. $\frac{-1}{3}\begin{bmatrix} -3 & 0 & 0 \\ 3 & -1 & 0 \\ -9 & -2 & 3 \end{bmatrix}$

C. $\frac{-1}{3}\begin{bmatrix} 3 & 0 & 0 \\ 3 & -1 & 0 \\ -9 & -2 & 3 \end{bmatrix}$

D. $\frac{-1}{3}\begin{bmatrix} -3 & 0 & 0 \\ -3 & -1 & 0 \\ -9 & -2 & 3 \end{bmatrix}$

Answer: B

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234. If $A = \begin{bmatrix} 1 & 0 & 0 \\ a & 1 & 0 \\ b & c & 1 \end{bmatrix}$, then $A^{-1} =$

A. $\begin{bmatrix} 1 & 0 & 1 \\ -a & 1 & 0 \\ b - ac & c & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 0 & 0 \\ a & 1 & 0 \\ ac-b & -c & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 0 & 0 \\ -a & 1 & 0 \\ b-ac & c & 1 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 0 & 0 \\ -a & 1 & 0 \\ ac-b & -c & 1 \end{bmatrix}$

Answer: D

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235. The inverse of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 4 \\ 0 & 0 & 5 \end{bmatrix}$ is

A. $\frac{1}{5}\begin{bmatrix} 5 & -5 & 1 \\ 0 & 5 & -4 \\ 0 & 0 & 2 \end{bmatrix}$

B. $\frac{-1}{5}\begin{bmatrix} 5 & -5 & 1 \\ 0 & 5 & -4 \\ 0 & 0 & 2 \end{bmatrix}$

C. $\frac{1}{10}\begin{bmatrix} 10 & -10 & 2 \\ 0 & 5 & -4 \\ 0 & 0 & 2 \end{bmatrix}$

D. $\frac{-1}{10}\begin{bmatrix} 10 & -10 & 2 \\ 0 & 5 & -4 \\ 0 & 0 & 2 \end{bmatrix}$

Answer: C

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236. The inverse of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 5 \\ 2 & 4 & 7 \end{bmatrix}$ is

A. $\begin{bmatrix} -13 & -2 & 7 \\ 3 & -1 & -2 \\ 2 & 0 & -1 \end{bmatrix}$

B. $\begin{bmatrix} 13 & 2 & -7 \\ -3 & -1 & 2 \\ -2 & 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 13 & 2 & -7 \\ -3 & -1 & 2 \\ -2 & 0 & -1 \end{bmatrix}$

D. $\begin{bmatrix} 13 & 2 & -7 \\ -3 & -1 & 2 \\ -2 & -2 & 2 \end{bmatrix}$

Answer: B

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237. The inverse of the matrix $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$ is

A. $\frac{-1}{6}\begin{bmatrix} -4 & 2 & -2 \\ 3 & 0 & -3 \\ -2 & -2 & 2 \end{bmatrix}$

B. $\frac{1}{6}\begin{bmatrix} -4 & 2 & -2 \\ 3 & 0 & -3 \\ -2 & -2 & 2 \end{bmatrix}$

C. $\begin{bmatrix} -2 & 1 & -1 \\ 1 & 0 & -1 \\ -2 & -2 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 0 & 1 \\ 2 & 2 & -2 \end{bmatrix}$

Answer: A

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238. The inverse of the matrix $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ is

A. $\frac{-1}{2}\begin{bmatrix} 3 & 1 & -1 \\ 1 & 3 & 1 \\ -1 & 1 & 3 \end{bmatrix}$

B. $\frac{1}{2}\begin{bmatrix}3 & 1 & -1\\ 1 & 3 & 1\\ -1 & 1 & 3\end{bmatrix}$

C. $\frac{-1}{4}\begin{bmatrix}3 & 1 & -1\\ 1 & 3 & 1\\ -1 & 1 & 3\end{bmatrix}$

D. $\frac{1}{4}\begin{bmatrix}3 & 1 & -1\\ 1 & 3 & 1\\ -1 & 1 & 3\end{bmatrix}$

Answer: D

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239. The inverse of the matrix $\begin{bmatrix}0 & 1 & 2\\ 1 & 2 & 3\\ 3 & 1 & 1\end{bmatrix}$ is

A. $\frac{-1}{2}\begin{bmatrix}-1 & 1 & -1\\ 8 & -6 & 2\\ -5 & 3 & -1\end{bmatrix}$

B. $\frac{1}{2}\begin{bmatrix}-1 & 1 & -1\\ 8 & -6 & 1\\ -5 & 3 & -1\end{bmatrix}$

C. $\begin{bmatrix}-1 & 1 & -1\\ 4 & -3 & 1\\ -5 & 3 & -1\end{bmatrix}$

D. $\begin{bmatrix}1 & -1 & 1\\ -4 & 3 & -1\\ 4 & -3 & 1\end{bmatrix}$

Answer: A

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240. The inverse of the matrix $\begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$ is

A. $\begin{bmatrix} 3 & -1 & 1 \\ 5 & -2 & 2 \\ -15 & 6 & -5 \end{bmatrix}$

B. $\begin{bmatrix} -3 & 1 & -1 \\ -5 & 2 & -2 \\ 15 & -6 & 3 \end{bmatrix}$

C. $\begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$

D. $\begin{bmatrix} -3 & 1 & -1 \\ 15 & -6 & 5 \\ -5 & 2 & -2 \end{bmatrix}$

Answer: C

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241. The inverse of the matrix $\begin{bmatrix} 2 & -3 & 3 \\ 2 & 2 & 3 \\ 3 & -2 & 2 \end{bmatrix}$ is

A. $\frac{-1}{5}\begin{bmatrix} -2 & 0 & 3 \\ -1 & 1 & 0 \\ 2 & 1 & -2 \end{bmatrix}$

B. $\frac{1}{5}\begin{bmatrix} -2 & 0 & 3 \\ -1 & 1 & 0 \\ 2 & 1 & -2 \end{bmatrix}$

C. $\begin{bmatrix} 2 & 0 & -3 \\ 1 & -1 & 0 \\ -2 & -1 & 2 \end{bmatrix}$

D. $\begin{bmatrix} -2 & 0 & 3 \\ -1 & 1 & 0 \\ 2 & 1 & -2 \end{bmatrix}$

Answer: B

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242. The inverse of the matrix $\begin{bmatrix} 1 & 2 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{bmatrix}$ is

A. $\frac{1}{5}\begin{bmatrix} 5 & 10 & -15 \\ -2 & 4 & 11 \\ -3 & 1 & 9 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 2 & -3 \\ -2 & 4 & 11 \\ -3 & 1 & 9 \end{bmatrix}$

C. $\frac{-1}{35}\begin{bmatrix} -25 & -10 & -15 \\ 10 & 4 & 11 \\ -15 & 1 & 6 \end{bmatrix}$

D. $\frac{1}{35}\begin{bmatrix} 25 & -10 & -15 \\ -10 & 4 & 11 \\ -15 & 1 & 6 \end{bmatrix}$

Answer: D

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243. The inverse of the matrix $\begin{bmatrix} 1 & 2 & -2 \\ 0 & -2 & 1 \\ -1 & 3 & 0 \end{bmatrix}$ is

A. $\begin{bmatrix} 3 & 6 & 2 \\ 1 & 2 & 1 \\ 2 & 5 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 3 & 6 & 2 \\ 10 & 2 & 1 \\ 2 & 5 & 2 \end{bmatrix}$

C. $-\begin{bmatrix} 3 & 6 & 2 \\ 2 & 5 & 2 \\ 1 & 2 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 2 & 5 & 2 \\ 3 & 6 & 2 \\ 1 & 2 & 1 \end{bmatrix}$

Answer: A

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244. The inverse of the matrix $\begin{bmatrix} 3 & 2 & 6 \\ 1 & 1 & 2 \\ 2 & 2 & 5 \end{bmatrix}$ is

A. $\begin{bmatrix} -2 & -1 & 2 \\ -3 & 1 & 0 \\ 2 & 0 & -1 \end{bmatrix}$

B. $\begin{bmatrix} -2 & 1 & -2 \\ -3 & -1 & 0 \\ -2 & 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} -1 & -2 & 2 \\ 1 & -3 & 0 \\ 0 & 2 & -1 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

Answer: D

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245. The inverse of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ -1 & 1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$ is

A. $\begin{bmatrix} 0 & -2 & 1 \\ 2 & 1 & 5 \\ -1 & 0 & -3 \end{bmatrix}$

B. $\begin{bmatrix} 0 & -2 & 1 \\ 6 & 1 & -5 \\ -1 & 0 & 1 \end{bmatrix}$

C. $\frac{1}{3}\begin{bmatrix} 0 & -2 & 1 \\ 6 & 1 & -5 \\ -3 & 0 & 3 \end{bmatrix}$

D. $\frac{-1}{3}\begin{bmatrix} 0 & -2 & 1 \\ 6 & 1 & -5 \\ -3 & 0 & 3 \end{bmatrix}$

Answer: C

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246. The inverse of the matrix $\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is

A. $-\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

C. $-\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Answer: B

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247. If $F(\alpha) = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$, where $\alpha \in R$, then $(F(\alpha))^{-1} =$

A. $F(\alpha^{-1})$

B. $F(-\alpha)$

C. $F(2\alpha)$

D. $-F(-\alpha)$

Answer: B

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248. Then inverse of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\theta & \sin\theta \\ 0 & \sin\theta & -\cos\theta \end{bmatrix}$ is

A. $\begin{bmatrix} -1 & 0 & 0 \\ 0 & -\cos\theta & -\sin\theta \\ 0 & -\sin\theta & \cos\theta \end{bmatrix}$

B. $\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\theta & \sin\theta \\ 0 & \sin\theta & -\cos\theta \end{bmatrix}$

D. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -\cos\theta & -\sin\theta \\ 1 & \sin\theta & \cos\theta \end{bmatrix}$

Answer: C

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249. If $A = \begin{bmatrix} \sec\theta & \tan\theta & 0 \\ \tan\theta & \sec\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then $A^{-1} =$

A. $\begin{bmatrix} \sec\theta & -\tan\theta & 0 \\ \tan\theta & -\sec\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} \sec\theta & -\tan\theta & 0 \\ -\tan\theta & \sec\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} -\sec\theta & -\tan\theta & 0 \\ \tan\theta & \sec\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} \sec\theta & \tan\theta & 0 \\ \tan\theta & \sec\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Answer: B

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250. $A = \begin{bmatrix} 3 & 2 & 6 \\ 1 & 1 & 2 \\ 2 & 2 & 5 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$, then

A. A and B are inverse of each other

B. A and B are equal matrices

C. $A^2 = B$

D. $B^2 = A$

Answer: A

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251. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & -2 & 4 \end{bmatrix}$ and $A^{-1} = \frac{1}{6}\left(A^2 + cA + dI\right)$, where $c, d \in R$ and I is an identity matrix of order 3, then (c, d)=

A. $(-6, -11)$

B. $(-6, 11)$

C. $(6, -11)$

D. $(6, 11)$

Answer: B

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252. If $A = \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$, and $A^{-1} + (A - 5I)(A - I)^2 =$

A. $\begin{bmatrix} 4 & -2 & -1 \\ -1 & 3 & -1 \\ -1 & -2 & 4 \end{bmatrix}$

B. $\begin{bmatrix} 4 & -2 & -1 \\ -1 & 3 & -1 \\ -1 & -2 & 4 \end{bmatrix}$

C. $\frac{1}{5}\begin{bmatrix} 4 & -2 & -1 \\ -1 & 3 & -1 \\ -1 & -2 & 4 \end{bmatrix}$

D. $\frac{-1}{5}\begin{bmatrix} 4 & -2 & -1 \\ -1 & 3 & -1 \\ -1 & -2 & 4 \end{bmatrix}$

Answer: C

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253. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ and A^{-1} exist and not equal to 0, then $(A^2 - 4A)A^{-1} =$

A. $\begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & 2 \\ 2 & 2 & -3 \end{bmatrix}$

B. $\begin{bmatrix} 3 & 2 & 2 \\ 2 & 3 & 2 \\ 2 & 2 & 3 \end{bmatrix}$

C. $\begin{bmatrix} 5 & 2 & 0 \\ 2 & 5 & 0 \\ 0 & 2 & 5 \end{bmatrix}$

D. $\begin{bmatrix} 5 & 2 & 5 \\ 2 & 5 & 5 \\ 5 & 5 & 2 \end{bmatrix}$

Answer: A

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254. If for $AX = B, B = \begin{bmatrix} 9 \\ 52 \\ 0 \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} 3 & -\frac{1}{2} & -\frac{1}{2} \\ -4 & \frac{3}{4} & \frac{5}{4} \\ 2 & -\frac{1}{4} & -\frac{3}{4} \end{bmatrix}$, then

X=

A. $\begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix}$

B. $\begin{bmatrix} \frac{1}{2} \\ -\frac{1}{2} \\ 2 \end{bmatrix}$

C. $\begin{bmatrix} -4 \\ 2 \\ 3 \end{bmatrix}$

D. $\begin{bmatrix} 3 \\ \frac{3}{4} \\ -\frac{3}{4} \end{bmatrix}$

Answer: A

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255. If $A=\begin{bmatrix}1&2&3\\-1&1&2\\1&2&4\end{bmatrix}, B=\begin{bmatrix}1\\2\\3\end{bmatrix}$ and $AX=B$, then X=

A. $\frac{1}{3}\begin{bmatrix}1\\7\\-6\end{bmatrix}$

B. $\frac{1}{3}\begin{bmatrix}-1\\-7\\6\end{bmatrix}$

C. $\begin{bmatrix}1\\7\\-2\end{bmatrix}$

D. $\begin{bmatrix}-1\\-7\\2\end{bmatrix}$

Answer: B

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256. If $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}, b = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 5 \\ 2 & 4 & 7 \end{bmatrix}$ and $XA = B$, then X=

A. $\frac{1}{3}\begin{bmatrix} 4 & 4 & 2 \\ 11 & 8 & -5 \\ 10 & 10 & 2 \end{bmatrix}$

B. $\frac{1}{2}\begin{bmatrix} 4 & 4 & 2 \\ 11 & 8 & -5 \\ 10 & 10 & 2 \end{bmatrix}$

C. $\frac{1}{6}\begin{bmatrix} 4 & 4 & 2 \\ 11 & 8 & -5 \\ 10 & 10 & 2 \end{bmatrix}$

D. $\frac{1}{3}\begin{bmatrix} 2 & 2 & 1 \\ 11 & 8 & -5 \\ 10 & 10 & 5 \end{bmatrix}$

Answer: C

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257. If $A = \begin{bmatrix} -2 & 0 & 0 \\ -2 & -1 & 3 \end{bmatrix}, B = \begin{bmatrix} 0 & 1 \\ 2 & 3 \\ 1 & -1 \end{bmatrix}$, then

A. $(AB)^{-1}$ not exist

B. $(AB)^{-1}$ is null matrix

C. $(AB)^{-1}$ exist

D. $(AB)^{-1}$ unit matrix

Answer: C

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258. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & -2 & -3 \end{bmatrix}, B = \begin{bmatrix} 1 & -1 \\ 1 & 2 \\ 1 & -1 \end{bmatrix}$, then

A. $(AB)^{-1}$ exist

B. $(AB)^{-1}$ not exist

C. $(BA)^{-1}$ exist

D. $(AB)^{-1} = (BA)^{-1}$

Answer: A

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259. If $A = \begin{bmatrix} 2 & 2 \\ -3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$, then $\left(B^{-1}A^{-1}\right)^{-1} =$

A. $\begin{bmatrix} 2 & -2 \\ 2 & 3 \end{bmatrix}$

B. $\begin{bmatrix} 2 & 2 \\ -2 & 3 \end{bmatrix}$

C. $\begin{bmatrix} 2 & -3 \\ 2 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 1 & -1 \\ -2 & 3 \end{bmatrix}$

Answer: A

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260. If $A = \begin{bmatrix} 2 & 2 \\ -3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$, then $\left(B^{-1}A^{-1}\right)^{-1} =$

A. $\begin{bmatrix} 3 & -2 \\ 2 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 2 & -2 \\ 2 & 3 \end{bmatrix}$

C. $\frac{1}{18}\begin{bmatrix} 3 & 2 \\ -2 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 3 & 1 \\ 2 & 3 \end{bmatrix}$

Answer: A

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261. If $A=\begin{bmatrix}4&1\\2&3\end{bmatrix}$ and $B=\begin{bmatrix}2&1\\0&-2\end{bmatrix}$, then $(AB)^{-1}=$

A. $\begin{bmatrix}\frac{1}{10}&\frac{1}{20}\\\frac{1}{5}&-\frac{1}{5}\end{bmatrix}$

B. $\begin{bmatrix}-\frac{1}{10}&\frac{1}{20}\\\frac{1}{5}&-\frac{1}{5}\end{bmatrix}$

C. $\begin{bmatrix}\frac{1}{10}&\frac{1}{20}\\\frac{1}{10}&-\frac{1}{5}\end{bmatrix}$

D. $\begin{bmatrix}1&0\\0&1\end{bmatrix}$

Answer: C

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262. If $A=\begin{bmatrix}2&3\\1&2\end{bmatrix}$, $B=\begin{bmatrix}3&1\\0&3\end{bmatrix}$ then $B^{-1}A^{-1}=$

A. $\begin{bmatrix}1&-2\\-5&9\end{bmatrix}$

B. $\begin{bmatrix} -1 & 3 \\ 5 & -9 \end{bmatrix}$

C. $\begin{bmatrix} -1 & 2 \\ 5 & -9 \end{bmatrix}$

D. $\begin{bmatrix} -1 & 2 \\ 5 & 4 \end{bmatrix}$

Answer: C

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263. If $A = \begin{bmatrix} 2 & 3 \\ 7 & 11 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$ then $(AB)^{-1} =$

A. $\begin{bmatrix} 2 & 3 \\ 7 & 11 \end{bmatrix}$

B. $-\begin{bmatrix} 2 & 5 \\ 7 & 11 \end{bmatrix}$

C. $\begin{bmatrix} 11 & -3 \\ -40 & 11 \end{bmatrix}$

D. $-\begin{bmatrix} 2 & -3 \\ -7 & 1 \end{bmatrix}$

Answer: C

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264. If

$F(\alpha) = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $G(\beta) = \begin{bmatrix} \cos\beta & 0 & \sin\beta \\ 0 & 1 & 0 \\ -\sin\beta & 0 & \cos\beta \end{bmatrix}$, $then[F($

is equal to (A) $F(-\alpha)G(-\beta)$ (B) $G(-\beta)F(-\alpha 0$ (C) $F(\alpha^{-1})G(\beta^{-1})$ (D) $G(\beta^{-1})F(\alpha^{-1})$

A. $F(\alpha) - G(\beta)$

B. $-F(\alpha) - G(\beta)$

C. $(F(\alpha))^{-1}(G(\beta))^{-1}$

D. $(G(\beta))^{-1}(F(\alpha))^{-1}$

Answer: D

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265. Let $A = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{pmatrix}$. If u_1 and u_2 are column matrices such that $Au_1 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$ and $Au_2 = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$, then $u_1 + u_2$ is equal to :

A. $\begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix}$

B. $\begin{bmatrix} 1 \\ -1 \\ -1 \end{bmatrix}$

C. $\begin{bmatrix} -1 \\ -1 \\ 0 \end{bmatrix}$

D. $\begin{bmatrix} -1 \\ 1 \\ -1 \end{bmatrix}$

Answer: B

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266. Equations $x + y = 2, 2x + 2y = 3$ will have

A. no solution

B. only one solution

C. many finite solution

D. trivial solution

Answer: A

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267. If $\begin{bmatrix} x-y-z \\ -y+z \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 5 \\ 3 \end{bmatrix}$ then the values of x, y and z are respectively

A. $0, \ -3, 3$

B. $1, \ -2, 3$

C. $5, 2, 2$

D. $11, 8, 3$

Answer: B

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268. If $\begin{bmatrix} 1 & 1 & 1 \\ 1 & -2 & -2 \\ 1 & 3 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 3 \\ 4 \end{bmatrix}$, then $\begin{bmatrix} x \\ y \\ z \end{bmatrix} =$

A. $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$

D. $\begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix}$

Answer: D

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269. If $A = \begin{bmatrix} 1 & -1 & -2 \\ 2 & 1 & 1 \\ 4 & -1 & 2 \end{bmatrix}, B = \begin{bmatrix} 3 \\ 5 \\ 11 \end{bmatrix}, X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ and $AX = B$

then X=

A. $\begin{bmatrix} \frac{8}{3} \\ \frac{-1}{3} \\ 0 \end{bmatrix}$

B. $\begin{bmatrix} \frac{8}{3} \\ \frac{1}{3} \\ 0 \end{bmatrix}$

C. $\begin{bmatrix} \frac{-8}{3} \\ \frac{1}{3} \\ 0 \end{bmatrix}$

D. $\begin{bmatrix} \frac{-8}{3} \\ \frac{-1}{3} \\ 0 \end{bmatrix}$

Answer: A

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270. If $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \frac{1}{40}\begin{bmatrix} 5 & 10 & -5 \\ -5 & -2 & 13 \\ 10 & -4 & 6 \end{bmatrix}\begin{bmatrix} 5 \\ 0 \\ 5 \end{bmatrix}$, then $x+y+z=$

A. 3

B. 0

C. 2

D. 1

Answer: A

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271. The values of x, y, z for the equations $x+y+z=1, 2x+3y+2z=2, ax+ay+2az=4$ are

A. $x=2-\frac{4}{a}, y=0, z=\frac{4}{a}-1$

B. $x=2+\frac{4}{a}, y=0, z=\frac{4}{a}-1$

C. $x=2-\frac{4}{a}, y=0, z=\frac{4}{a}+1$

D. $x=2+\frac{4}{a}, y=0, z=\frac{4}{a}+1$

Answer: A

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272. The values of x, y, z for the equations $5x-y+4z=5, 2x+3y+5z=2, 5x-2y+6z=1$ are

A. $x=3, y=3, z=-2$

B. $x=1, y=2, z=1$

C. $x = 1, y = 3, z = 5$

D. $x = 3, y = 2, z = -1$

Answer: A

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273. The values of x, y, z for the equations $x - y + z = 1, 2x - y = 1, 3x + 3y - 4z = 2$ are

A. $x = 2, y = 3, z = 5$

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

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

D. $x = 3, y = 1, z = 2$

Answer: B

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274. The values of x, y, z for the equations $x + y + z = 6, 3x - y + 2z = 7, 5x + 5y - 4z = 3$ are

A. $x = 3, y = 2, z = 5$

B. $x = 1, y = 4, z = -2$

C. $x = 2, y = 7, z = 8$

D. $x = 1, y = 2, z = 3$

Answer: D

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275. Solve the following equations by the method of reduction

$2x - y + z = 1, x + 2y + 3x = 8, 3x + y - 4z = 1.$

A. $x = 0, y = 5, z = 2$

B. $x = 3, y = 1, z = -2$

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

D. $x = 2, y = -1, z = 5$

Answer: C

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276. If the inverse of the matriix $\begin{bmatrix} \alpha & 14 & -1 \\ 2 & 3 & 1 \\ 6 & 2 & 3 \end{bmatrix}$ does not exist, then the vlaue of α is

A. 1

B. -1

C. 0

D. -2

Answer: D

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277. if $A = \begin{bmatrix} 2 & -3 \\ -4 & 1 \end{bmatrix}$ then $(3A^2 + 12A) = ?$

A. $\begin{bmatrix} 72 & -63 \\ -84 & 52 \end{bmatrix}$

B. $\begin{bmatrix} 72 & -84 \\ -63 & 51 \end{bmatrix}$

C. $\begin{bmatrix} 51 & 63 \\ 84 & 72 \end{bmatrix}$

D. $\begin{bmatrix} 51 & 84 \\ 63 & 72 \end{bmatrix}$

Answer: C

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