

1. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ and $A^2 - kA - I_2 = 0$, then the value of k is equal to
 (A) 4 (B) -4
 (C) 8 (D) -8
2. If $A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$, then $3A - 2B$ is the matrix
 (A) $\begin{bmatrix} -14 & 6 & -2 \\ 4 & 5 & 2 \end{bmatrix}$ (B) $\begin{bmatrix} 14 & -6 & -3 \\ -4 & -5 & -2 \end{bmatrix}$
 (C) $\begin{bmatrix} -14 & -6 & 3 \\ 4 & -5 & 2 \end{bmatrix}$ (D) $\begin{bmatrix} 14 & 6 & -3 \\ 4 & 5 & -2 \end{bmatrix}$
3. The matrix $\begin{bmatrix} 5 & 10 & 3 \\ -2 & -4 & 6 \\ -1 & -2 & b \end{bmatrix}$ is a singular matrix equal to
 (A) -3 (B) 3
 (C) 0 (D) for any value of b
4. If the matrix $A = \begin{bmatrix} \alpha & \beta \\ \beta & \alpha \end{bmatrix}$ is such that $A^2 = I$, then which one of the following is correct?
 (A) $\alpha = 0, \beta = 1$ or $\alpha = 1, \beta = 0$
 (B) $\alpha = 0, \beta \neq 1$ or $\alpha \neq 1, \beta = 1$
 (C) $\alpha = 1, \beta \neq 0$ or $\alpha \neq 1, \beta = 1$
 (D) $\alpha \neq 0, \beta \neq 0$
5. If $A = \begin{bmatrix} 1 & 2 \\ 3 & -5 \end{bmatrix}$, then A^{-1} is equal to
 (A) $\begin{bmatrix} -5 & -2 \\ -3 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 5 & 2 \\ 11 & 11 \\ 3 & -1 \\ 11 & 11 \end{bmatrix}$
 (C) $\begin{bmatrix} -5 & -2 \\ 11 & 11 \\ 3 & 1 \\ 11 & 11 \end{bmatrix}$ (D) $\begin{bmatrix} 5 & 2 \\ 3 & -1 \end{bmatrix}$
6. If $A = \begin{bmatrix} \alpha & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$ such that $A^2 = B$, then what is the value of α ?
 (A) -1 (B) 1
 (C) 2 (D) 4
7. If $\begin{bmatrix} 1 & -3 & 2 \\ 2 & -8 & 5 \\ 4 & 2 & \lambda \end{bmatrix}$ is not invertible matrix, then what is the value of λ ?
 (A) -1 (B) 0
 (C) 1 (D) 2
8. If a matrix A is such that $3A^3 + 2A^2 + 5A + I = 0$, then what is A^{-1} equal to?
 (A) $-(3A^2 + 2A + 5)$ (B) $3A^2 + 2A + 5I$
 (C) $3A^2 - 2A - 5I$ (D) $-(3A^2 + 2A + 5)$
9. 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 $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ is equal to
 (A) $\begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix}$
 (C) $\begin{bmatrix} 5 \\ -2 \\ 1 \end{bmatrix}$ (D) $\begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$
10. A and B are two matrices such that $AB = A$ and $BA = B$, then what is the value of B^2 ?
 (A) B (B) A
 (C) 1 (D) -1
11. What is the order of the product $\begin{bmatrix} x & y & z \end{bmatrix} \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix}$?
 (A) 3×1 (B) 1×1
 (C) 1×3 (D) 3×3

12. Let $A = \begin{bmatrix} 5 & 6 & 1 \\ 2 & -1 & 5 \end{bmatrix}$. Let there exist a matrix

B such that $AB = \begin{bmatrix} 35 & 49 \\ 29 & 13 \end{bmatrix}$. What is B equal to?

(A) $\begin{bmatrix} 5 & 1 & 4 \\ 2 & 6 & 3 \end{bmatrix}$ (B) $\begin{bmatrix} 2 & 6 & 3 \\ 5 & 1 & 4 \end{bmatrix}$

(C) $\begin{bmatrix} 5 & 2 \\ 1 & 6 \\ 4 & 3 \end{bmatrix}$ (D) $\begin{bmatrix} 2 & 5 \\ 6 & 1 \\ 3 & 4 \end{bmatrix}$

13. If a matrix $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then A^4 is equal to

(A) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

14. The inverse of the matrix $\begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$, is

(A) $\begin{bmatrix} \cos \alpha & \sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$ (B) $\begin{bmatrix} \cos \alpha & \sin \alpha \\ -\sin \alpha & \cos \alpha \end{bmatrix}$

(C) $\begin{bmatrix} -\cos \alpha & \sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$ (D) $\begin{bmatrix} \cos \alpha & \sin \alpha \\ \sin \alpha & -\cos \alpha \end{bmatrix}$

15. If X and Y are the matrices of order 2×2

each and $2X - 3Y = \begin{bmatrix} -7 & 0 \\ 7 & -13 \end{bmatrix}$ and

$3X + 2Y = \begin{bmatrix} 9 & 13 \\ 4 & 13 \end{bmatrix}$, then what is Y equal to?

(A) $\begin{bmatrix} 1 & 3 \\ -2 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 3 & 2 \\ -1 & 5 \end{bmatrix}$ (D) $\begin{bmatrix} 3 & 2 \\ 1 & -5 \end{bmatrix}$

16. Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = [a_{ij}]$, where $i, j = 1, 2$. If its

inverse matrix is $[b_{ij}]$, what is b_{22} ?

(A) -2 (B) 1

(C) $\frac{3}{2}$ (D) $-\frac{1}{2}$

17. If $A = \begin{bmatrix} \omega & 0 \\ 0 & \omega \end{bmatrix}$, where ω is cube root of unity,

then what is A^{100} equal to?

(A) A (B) $-A$

(C) Null matrix (D) Identity matrix

18. If $A = \begin{bmatrix} 1 & -2 & -3 \\ 2 & 1 & -2 \\ 3 & 2 & 1 \end{bmatrix}$, then which one of the

following is correct?

(A) A is symmetric matrix.

(B) A is anti-symmetric matrix.

(C) A is singular matrix.

(D) A is non-singular matrix.

19. If $A = \begin{bmatrix} 2x & 0 \\ x & x \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix}$, then what is the value of x ?

(A) $-\frac{1}{2}$ (B) $\frac{1}{2}$

(C) 1 (D) 2

20. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$, then what is $A(\text{adj } A)$ equal to?

(A) $\begin{bmatrix} 0 & 10 \\ 10 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 10 \\ 10 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 10 & 1 \\ 1 & 10 \end{bmatrix}$

21. If A is any 2×2 matrix such that

$\begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} A = \begin{bmatrix} -1 & 0 \\ 6 & 3 \end{bmatrix}$, then what is A equal to?

(A) $\begin{bmatrix} -5 & 1 \\ -2 & 2 \end{bmatrix}$ (B) $\begin{bmatrix} -5 & -2 \\ 1 & 2 \end{bmatrix}$

(C) $\begin{bmatrix} -5 & -2 \\ 2 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 5 & 2 \\ -2 & -1 \end{bmatrix}$