

JEE	Class - 12 th	Topic - Adjoint and Inverse of a Matrix
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- If $A = \begin{bmatrix} 3 & 4 \\ 5 & 7 \end{bmatrix}$, then $A \cdot (\text{adj}A)$ is equal to

(a) A (b) $|A|$
 (c) $|A|I$ (d) None of these
- If $A = \begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & -3 \\ 2 & 1 & 0 \end{bmatrix}$, $B = (\text{adj}A)$ and $C = 5A$, then $\frac{|\text{adj}B|}{|C|}$ is equal to

(a) 5 (b) 25
 (c) -1 (d) 1
- If $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$, then $\det[\text{adj}(\text{adj}A)]$ is equal to

(a) 12^4 (b) 13^4
 (c) 14^4 (d) None of these
- If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$, then $\text{adj} A$ is equal to

(a) A (b) A'
 (c) $3A$ (d) $3A'$
- If $A = \begin{bmatrix} 5a & -b \\ 3 & 2 \end{bmatrix}$ and $A \text{ adj } A = AA^T$, then $5a + b$ is equal to

(a) -1 (b) 5
 (c) 4 (d) 13
- If $A^2 - A + I = 0$, then the inverse of A is

(a) $A - I$ (b) $I - A$
 (c) $A + I$ (d) A

7. The element in the first row and third column of the inverse of the

matrix $\begin{bmatrix} 1 & 2 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$ is

- (a) -2 (b) 0
(c) 1 (d) 7

8. Let A and B be two invertible matrices of order 3×3 . If $\det(ABA^T) = 8$ and $\det(AB^{-1}) = 8$, then $\det(BA^{-1}B^T)$ is equal to
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- (a) 1 (b) $\frac{1}{4}$
(c) $\frac{1}{16}$ (d) 16

9. If $A = \begin{bmatrix} e^t & e^{-t}\cos t & e^{-t}\sin t \\ e^t & 2e^{-t}\sin t & e^t - e^{-t}\cos t - e^{-t}\sin t - e^{-t}\sin t + e^{-t}\cos t \\ e^t & 2e^{-t}\sin t & -2e^{-t}\cos t \end{bmatrix}$

then A is

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- (a) invertible only when $t = \pi$
(b) invertible for every $t \in \mathbb{R}$
(c) not invertible for any $t \in \mathbb{R}$
(d) invertible only when $t = \frac{\pi}{2}$

10. If $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix} \cdots \begin{bmatrix} 1 & n-1 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 78 \\ 0 & 1 \end{bmatrix}$, then the inverse of $\begin{bmatrix} 1 & n \\ 0 & 1 \end{bmatrix}$ is

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- (a) $\begin{bmatrix} 1 & 0 \\ 12 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & -13 \\ 0 & 1 \end{bmatrix}$
(c) $\begin{bmatrix} 1 & 0 \\ 13 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & -12 \\ 0 & 1 \end{bmatrix}$

11. $A = \begin{bmatrix} 0 & 3 \\ 2 & 0 \end{bmatrix}$ and $A^{-1} = \lambda(\text{adj}A)$, then λ is equal to

- (a) $-\frac{1}{6}$ (b) $\frac{1}{3}$
(c) $-\frac{1}{3}$ (d) $\frac{1}{6}$

12. Let $X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$, $A = \begin{bmatrix} 1 & -1 & 2 \\ 2 & 0 & 1 \\ 3 & 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 \\ 1 \\ 4 \end{bmatrix}$. If $AX = B$, then X is equal

to

- (a) $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ (b) $\begin{bmatrix} -1 \\ -2 \\ 3 \end{bmatrix}$
(c) $\begin{bmatrix} -1 \\ -2 \\ -3 \end{bmatrix}$ (d) $\begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$

13. If $f(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$,

$$G(y) = \begin{bmatrix} \cos y & 0 & \sin y \\ 0 & 1 & 0 \\ -\sin y & 0 & \cos y \end{bmatrix},$$

then $[F(x) \cdot G(y)]^{-1}$ is equal to

- (a) $F(x)G(-y)$ (b) $F^{-1}(x)G^{-1}(y)$
(c) $G^{-1}(y)F^{-1}(x)$ (d) $G(-y)F(-x)$

14. If $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & a & 1 \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} 1/2 & -1/2 & 1/2 \\ -4 & 3 & c \\ 5/2 & -3/2 & 1/2 \end{bmatrix}$, then

- (a) $a = 2, c = 1/2$ (b) $a = 1, c = -1$
(c) $a = -1, c = 1$ (d) $a = \frac{1}{2}, c = \frac{1}{2}$