

PYQSide

JEE MAIN DETERMINANTS — PROPERTIES OF DETERMINANTS (JEE) — PYQS

Max. Marks: 16

Questions: 4

Section A (MCQ)

Q.1 If $f: \mathbb{N} \rightarrow \mathbb{Z}$ is defined by

$$f(n) = \begin{vmatrix} n & -1 & -5 \\ -2n^2 & 3(2k+1) & 2k+1 \\ -3n^3 & 3k(2k+1) & 3k(k+2)+1 \end{vmatrix}, k \in \mathbb{N},$$

and $\sum_{n=1}^k f(n) = 98$, then k is equal to :

[JEE Main 2026 (Online) 5th April Evening Shift]

- (1) 3 (2) 4 (3) 5 (4) 6

Scan or tap for the full solution 

Q.2 Among the statements :

I: If

$$\begin{vmatrix} 1 & \cos \alpha & \cos \beta \\ \cos \alpha & 1 & \cos \gamma \\ \cos \beta & \cos \gamma & 1 \end{vmatrix} = \begin{vmatrix} 0 & \cos \alpha & \cos \beta \\ \cos \alpha & 0 & \cos \gamma \\ \cos \beta & \cos \gamma & 0 \end{vmatrix},$$

then $\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = \frac{3}{2}$, and

II: If $\begin{vmatrix} x^2+x & x+1 & x-2 \\ 2x^2+3x-1 & 3x & 3x-3 \\ x^2+2x+3 & 2x-1 & 2x-1 \end{vmatrix} = px+q$, then

$$p^2 = 196q^2.$$

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) both are true (2) both are false
(3) only I is true (4) only II is true

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Q.3 If $y(x) = \begin{vmatrix} \sin x & \cos x & \sin x + \cos x + 1 \\ 27 & 28 & 27 \\ 1 & 1 & 1 \end{vmatrix}$, $x \in \mathbb{R}$,

then $\frac{d^2y}{dx^2} + y$ is equal to

[JEE Main 2025 (Online) 3rd April Morning Shift]

- (1) 28 (2) 27 (3) -1 (4) 1

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Q.4 Let M and m respectively be the maximum and the minimum values of

$$f(x) = \begin{vmatrix} 1 + \sin^2 x & \cos^2 x & 4 \sin 4x \\ \sin^2 x & 1 + \cos^2 x & 4 \sin 4x \\ \sin^2 x & \cos^2 x & 1 + 4 \sin 4x \end{vmatrix}, x \in \mathbb{R}$$

Then $M^4 - m^4$ is equal to :

[JEE Main 2025 (Online) 29th January Morning Shift]

- (1) 1280 (2) 1040 (3) 1215 (4) 1295

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ANSWER KEY

Ques.	1	2	3	4							
Ans.	1	2	3	1							