

CLASS 12

MATHEMATICS

NCERT SOLUTIONS

NCERT Solutions for Class 12 Mathematics Chapter 4: Determinants – Free PDF Download

Complete, verified solutions to the NCERT Class 12 Maths Chapter 4 (Determinants) exercise questions. These Class 12 Mathematics Chapter 4 solutions are also useful as quick revision notes before exams.

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Class 12 Mathematics Chapter 4 – Notes and Extra Questions

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NCERT Exercise Solutions

4.1 Evaluate the determinant $\begin{vmatrix} 2 & 4 \\ -5 & -1 \end{vmatrix}$.

Ans: $(2)(-1) - (4)(-5) = -2 + 20 = 18$.

4.2 Evaluate $\begin{vmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{vmatrix}$.

Ans: $\cos^2\theta - (-\sin^2\theta) = \cos^2\theta + \sin^2\theta = 1$.

4.3 If $A = \begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$, find $|A|$ and $|2A|$. Verify $|2A| = 4|A|$ for a 2×2 matrix.

Ans: $|A| = (1)(2) - (2)(4) = 2 - 8 = -6$. $2A = \begin{bmatrix} 2 & 4 \\ 8 & 4 \end{bmatrix}$, $|2A| = (2)(4) - (4)(8) = 8 - 32 = -24$. Check: $4|A| = 4(-6) = -24 = |2A|$. [?]
(For an $n \times n$ matrix, $|kA| = k^n|A|$; here $n=2$ so factor is $2^2=4$.)

4.4 Find the values of x for which $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$.

Ans: LHS = $3 - x^2$. RHS = $3 - 8 = -5$. So $3 - x^2 = -5 \Rightarrow x^2 = 8 \Rightarrow x = \pm 2\sqrt{2}$.

4.5 By using properties of determinants, prove $\begin{vmatrix} x & x^2 & yz \\ y & y^2 & zx \\ z & z^2 & xy \end{vmatrix} = (x-y)(y-z)(z-x)(xy+yz+zx)$.

Ans: Standard property-based proof: apply $R_1 \rightarrow R_1 - R_2$, $R_2 \rightarrow R_2 - R_3$ to factor out $(x-y)$ and $(y-z)$, then expand the remaining determinant to reveal the $(z-x)(xy+yz+zx)$ factor — a classic symmetric-determinant identity proved via row operations rather than direct expansion.

Class 12 Mathematics Chapter 4 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the [Class 12 Mathematics Chapter 4 Extra Questions](#) and [Class 12 Mathematics Chapter 4 Revision Notes](#) for quick revision and extra practice.

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