Class12-Maths-JEE-Mains-Formulas

October 18, 2025

Lesson	Concept	Formula / Key Point
Relations & Functions	Types of Relations	Reflexive, Symmetric, Transitive, Equivalence
	—	—
	Inverse Function	If $f(x)$ is one-one and onto, then $f^{-1}(f(x)) = x$
	—	—
Algebra	Quadratic Equations	Roots of $ax^2 + bx + c = 0$: $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
	—	—
	Complex Numbers	$z = r(\cos\theta + i\sin\theta)$ (Polar Form)
	—	—
	De Moivre's Theorem	$(\cos\theta + i\sin\theta)^n = \cos n\theta + i\sin n\theta$
	—	—
Calculus	Limit Definition	$\lim_{x\to a} f(x) = L$ if for every $\epsilon > 0$ there exists $\delta > 0$ such that …
	—	—
	Derivatives	$\frac{d}{dx}x^n = nx^{n-1}$, $\frac{d}{dx}\sin x = \cos x$, $\frac{d}{dx}e^x = e^x$
	—	—
	Chain Rule	If $y = f(u)$ and $u = g(x)$, then $\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$
	—	—
	Integration	$\int x^n dx = \frac{x^{n+1}}{n+1} + C$, $\int e^x dx = e^x + C$
	—	—
Vectors & 3D Geometry	Dot Product	$\vec{a} \cdot \vec{b} = \lvert\vec{a}\rvert\lvert\vec{b}\rvert\cos\theta$
	—	—
	Cross Product	$\vec{a} \times \vec{b} = \lvert\vec{a}\rvert\lvert\vec{b}\rvert\sin\theta\hat{n}$
	—	—
	Equation of a Line	$\frac{x-x_1}{l} = \frac{y-y_1}{m} = \frac{z-z_1}{n}$
	—	—
	Equation of a Plane	$ax + by + cz + d = 0$
	—	—
Probability & Statistics	Conditional Probability	$P(A\|B) = \frac{P(A\cap B)}{P(B)}$
	—	—
	Bayes Theorem	$P(A_i\|B) = \frac{P(A_i)P(B\|A_i)}{\sum P(A_j)P(B\|A_j)}$
	—	—

Lesson	Concept	Formula / Key Point
Matrices & Determinants	Matrix Multiplication	$(AB)_{ij} = \sum_k A_{ik}B_{kj}$
	—	—
	Determinant of 2x2	$\det \begin{bmatrix} a & b \\ c & d \end{bmatrix} = ad - bc$
	—	—
	Inverse of Matrix	$A^{-1} = \frac{1}{\det A}\text{adj}A$ (if $\det A \neq 0$)
	—	—
Differential Equations	General Form	$\frac{dy}{dx} + Py = Q$
	—	—
	Solution	$y = e^{-\int P dx}\left(\int Q e^{\int P dx} dx + C\right)$
	—	—
Vector Algebra	Scalar Triple Product	$\vec{a} \cdot (\vec{b} \times \vec{c})$ (volume of parallelepiped)
	—	—
Application of Derivatives	Maxima and Minima	Use $\frac{dy}{dx} = 0$ and second derivative test
	—	—
	Increasing/Decreasing Functions	$f'(x) > 0$ increasing, $f'(x) < 0$ decreasing