Physics Formula Sheet

Chapter by chapter, topic by topic. Written by the PadhoNa team for quick revision.

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CHAPTER 2

Mathematics in Physics

Vectors

RESULTANT

$$R = \sqrt{A^2 + B^2 + 2AB\cos\theta}, \qquad \tan\alpha = \frac{B\sin\theta}{A + B\cos\theta}$$

DOT AND CROSS PRODUCT

$$\vec{A}\cdot\vec{B} = AB\cos\theta, \qquad |\vec{A}\times\vec{B}| = AB\sin\theta$$

COMPONENTS

$$A_x = A\cos\theta,\ \ A_y = A\sin\theta,\ \ \text{projection of } \vec{A} \text{ on } \vec{B} = \frac{\vec{A}\cdot\vec{B}}{B}$$

Calculus in physics

$$v = \frac{dx}{dt}, \qquad a = \frac{dv}{dt} = v\frac{dv}{dx}, \qquad x = \int v\,dt$$

SMALL APPROXIMATIONS

$$(1+x)^n \approx 1 + nx, \qquad \sin\theta \approx \tan\theta \approx \theta, \qquad \cos\theta \approx 1 - \frac{\theta^2}{2}\ \ (\text{small})$$

MAXIMA / MINIMA

$$\frac{dy}{dx} = 0; \qquad \frac{d^2y}{dx^2} < 0\ \text{max},\ > 0\ \text{min}$$

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