classmate
Date
Page formula 1

Quantum mechanics.

$$i\hbar \frac{\partial \psi}{\partial t} = -\frac{\hbar^2}{2m}\frac{\partial^2 \psi}{\partial x^2} + V\psi ,$$

$$\hbar = \frac{h}{2\pi} = 1.054572 \times 10^{-34}\,\mathrm{J\,s}$$

$$\int_a^b |\psi(x,t)|^2 dx = \text{probability.}$$

Probability: $N = \sum_{j=0}^{\infty} N(j)$, $P(j) = \frac{N(j)}{N}$

Discrete

$$\sum_{j=0}^{\infty} P(j) = 1 , \quad \langle j \rangle = \frac{\sum j N(j)}{N} = \sum_{j=0}^{\infty} j P(j)$$

$$\langle j^2 \rangle = \sum_{j=0}^{\infty} j^2 P(j) , \quad \langle f(j) \rangle = \sum_{j=0}^{\infty} f(j) P(j)$$

Variance $\Delta j = j - \langle j \rangle$, $\langle \Delta j \rangle = 0$.

$\sigma^2 = \langle (\Delta j)^2 \rangle$, σ standard deviation

$$\sigma = \sqrt{\langle j^2 \rangle - \langle j \rangle^2} , \quad \langle j^2 \rangle \geq \langle j \rangle^2$$

Probability: $\rho(x)\,dx$,

$$P_{ab} = \int_a^b \rho(x)\,dx , \quad 1 = \int_{-\infty}^{\infty} \rho(x)\,dx$$

$$\langle x \rangle = \int_{-\infty}^{\infty} x \rho(x)\,dx$$

$$\langle f(x) \rangle = \int_{-\infty}^{\infty} f(x) \rho(x)\,dx$$

$$\sigma^2 \equiv \langle (\Delta x)^2 \rangle = \langle x^2 \rangle - \langle x \rangle^2$$