Understanding Volatility

The Volatility is proportional to the square root of time, and not to time itself.

This is because volatility, and more generally standard deviation, is the square root of variance and because variance is proportional to time.

Therefore, volatility is proportional to square root of time.

https://www.macroption.com/converting-implied-volatility-to-daily-move/

https://www.macroption.com/

As most people in finance understand it, volatility is standard deviation of returns. **The calculation of (historical) volatility goes like this:**

Get daily closing prices of the security.

Calculate logarithmic returns for each day.

Calculate standard deviation of these logarithmic returns over a period of last N days.

The result (the standard deviation) is daily historical volatility.

If you want to transform it to annual volatility, multiply it by the square root of the number of trading days per year.

Historical Volatility Calculation

Mathematically, historical volatility is the (usually annualized) standard deviation of returns.

Detailed step-by-step guide can be observed in below article.

https://www.macroption.com/historical-volatility-calculation/

Historical Volatility Formula

The complete annualized historical volatility formula is:

$$\sigma = \sqrt{T}\sqrt{\frac{\sum_{i=1}^{n}(R_i - \bar{R})^2}{n-1}}$$

annualized historical volatility formula.

... which is the same as:

$$\sigma = \sqrt{\frac{T}{n-1}\sum_{i=1}^{n}(R_i - \bar{R})^2}$$

historical volatility formula

... where:

n = historical volatility period

T = number of periods per year (number of trading days when calculating historical volatility from daily closing prices).

https://www.macroption.com/converting-implied-volatility-to-daily-move/

https://www.macroption.com/why-is-volatility-proportional-to-square-root-of-time/

https://www.macroption.com/historical-volatility-calculation/

https://www.macroption.com/calculate-variance-standard-deviation-4-steps/

IV Range Calculator:

https://www.1stopinvestment.com/calculator/iv-range-calculator/

Market Range Calculator:

https://optionsdelta.in/range-calculator-based-on-vix/

Upstox Article:

https://upstox.com/uplearn/options-trading-101/options-pricing-concepts/37491-historical-volatility-and-implied-volatility/

Zerodha Article:

https://zerodha.com/varsity/chapter/volatility-calculation-historical/