fervent

Proof of Annualised Standard Deviation

[Mathematical Proof Series]

Designed by Fervent

The standard deviation σ is equal to the square root of the variance σ^2.

Converting daily risk to annual risk would then take the form:

$$\sqrt{\sigma^2 \times t}$$

Using the fact that the square root of a product of two numbers is the same as the product of their individual square roots:

$$\sqrt{\sigma^2 \times t} = \sqrt{\sigma^2} \times \sqrt{t}$$

Since $\sigma = \sqrt{\sigma^2}$ we have:

$$\sqrt{\sigma^2 \times t} = \sigma \times \sqrt{t}$$

This is why we multiply the standard deviation by the square root of t instead of just t when we want to annualise the volatility / risk of a stock.

QED