$$I = 2\sigma^4 = \int_0^\infty \mathrm{d}x\ x^3 \exp\!\left(-\frac{1}{2}\,\frac{x^2}{\sigma^2}\right) = \int_0^\infty \mathrm{d}x\ f(x)\,\mathrm{pdf}(x) \approx \frac{1}{N}\sum_{i=1}^{N} f(x_i)$$

$$\text{with: } f(x) = \sigma\sqrt{\frac{\pi}{2}}\,x^3\ ;\ \mathrm{pdf}(x) = \begin{cases} \frac{1}{\sigma}\sqrt{\frac{2}{\pi}}\exp\!\left(-\frac{1}{2}\,\frac{x^2}{\sigma^2}\right) & \text{if } x \geq 0 \\ 0 & \text{if } x < 0 \end{cases}$$