18. $\psi_n(x) = \frac{1}{\sqrt{2^n n!}} \left(\frac{m\omega}{\pi\hbar}\right)^{1/4} \cdot e^{-x^2/2} \cdot H_n(x)$

$* \sqrt{\frac{m\omega}{\hbar}} = 1$

$\frac{m\omega}{\hbar} = 1$

$\psi_n(x) = \frac{1}{\sqrt{2^n n!}} \left(\frac{1}{\pi}\right)^{1/4} \cdot e^{-x^2/2} \cdot H_n(x)$

$\psi_1(x) = \frac{1}{\sqrt{2}} \left(\frac{1}{\pi}\right)^{1/4} \cdot e^{-x^2/2} \cdot 2x$

$\downarrow$

$$\int_{-\infty}^{\infty} x^2 \left[\frac{2x \cdot e^{-x^2/2}}{\sqrt{2}} \left(\frac{1}{\pi}\right)^{1/4} \right]^2 dx$$

$$\int_{-\infty}^{\infty} \frac{4x^4}{2} \cdot e^{-x^2/2} \cdot \left(\frac{1}{\pi}\right)^{1/2} dx$$

$$\int_{-\infty}^{\infty} 2x^4 \cdot e^{-x^2/2} \left(\frac{1}{\pi}\right)^{1/2} dx$$