

2.59

$$p(x|\sigma) = \frac{1}{\sigma} f\left(\frac{x}{\sigma}\right)$$

$$\int_{-\infty}^{\infty} p(x|\sigma) = \int_{-\infty}^{\infty} \frac{1}{\sigma} f\left(\frac{x}{\sigma}\right) dx$$

Applying change of variable (1.27) by substituting $y = \frac{x}{\sigma}$,

$$= \int_{-\infty}^{\infty} \frac{1}{\sigma} f(y) dy \left| \frac{dx}{dy} \right|$$

$$= \int_{-\infty}^{\infty} \frac{1}{\sigma} f(y) dy |\sigma|$$

$$= \int_{-\infty}^{\infty} f(y) dy$$

$$= 1$$

Therefore, the density (2.236) will be correctly normalized, provided $f(x)$ is correctly normalized.