

Calculate the variance of x .

$$\begin{aligned} \text{var}_x = E_{xy} [(x - m_x)^2] &= \int_{-\infty}^{+\infty} (x - m_x)^2 f_x(x) dx \\ &= \int_0^1 \left(x - \frac{1}{3}\right)^2 x dx \end{aligned}$$