STAT 340: Example Assignment Question

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1. (a) Let $X \sim \mathrm{N}(0,1)$. Write down the density function of X, denoted by ϕ. Then sample $n = 10\,000$ realizations $X_1, \ldots, X_n \overset{\text{ind}}{\sim} \mathrm{N}(0,1)$ and compute

$$\hat{\mu} = \frac{1}{n} \sum_{i=1}^{n} X_i \quad \text{and} \quad \hat{\sigma} = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (X_i - \hat{\mu})^2}.$$

   (b) Plot a histogram of the sample from a) along with the density function ϕ in the same figure.