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1. Use the Box-Muller method and Marsaglia and Bray method to do the following:

   (a) Generate a sample of 100 and 10000 values from $\mathcal{N}(0, 1)$. Hence find the sample mean and variance.

   (b) Now plot a two-dimensional graph where the x axis will have the values that have been sampled and y axis will be the frequency or count of those values. Do this for both the cases, namely, 100 and 10000 samples.

   (c) Now use the above generated values to generated samples from $\mathcal{N}(0, 5)$ and $\mathcal{N}(5, 5)$. Hence plot the density function from the formula and also plot the sample distribution *in the same plot* in both the cases. How do these two plots compare in both the cases ?

2. Keep a track of the computational time required for both the methods. Which method is faster ?

3. For the Marsaglia and Bray method keep track of the proportion of values rejected. How does it compare with $1 - \frac{\pi}{4}$?