Exercise 3

- 1. Generate simulated values from the following distribution **stu** Ħ
 - (a) Exponential distribution
 - (b) Normal distribution (at least with standard Box-Mueller)
 - (c) Pareto distribution, with $\beta = 1$ and experiment with different values of k values: k = 2.05, k = 2.5, k = 3 and

k = 4.

Verify the results by comparing histograms with analytical results and perform tests for distribution type.

- 2. For the Pareto distribution with support on $[\beta, \infty]$ compare mean value and variance, with analytical results, which can be calculated as $E(X) = \beta \frac{k}{k-1}$ (for k > 1) and Var $(X) = \beta^2 \frac{k}{(k-1)^2(k-2)}$ (for k > 2). Explain problems if any. 3. For the normal distribution generate 100 95% confidence
- intervals for the mean and variance, each based on 10 observations. Discuss the results.
- 4. Simulate from the Pareto distribution using composition.