Computer project 1

The Monte-Carlo method for solving difficult integrals was developed more than 50 years ago. With modern computer power it is increasingly being used in practice. An exciting application is to implement optimal Bayesian estimators requiring integration over complicated distributions. A key component for doing this is to be able to generate samples from such distributions. A useful method is the "Rejection method", described in Example 5, Grimmett and Stirzaker page 123-124. Your task is to implement the method in Matlab, and verify that it works. The desired distribution is $f = N(0, \sigma)$, with $\sigma < 1$. To generate test samples we use the standard $N(0, 1)$ distribution. Try $\sigma = 1/2$ and $\sigma = 1/10$. Compare to a direct generation using scaled $N(0, 1)$ variables. What determines the number of test variables one has to generate, i.e. when can we expect the method to "work well"? (This is of course a toy example, since $N(0, \sigma)$ is not a difficult distribution. Feel free to try out more interesting cases!)