

Exercise 3. Use the rejection method presented in Section 3.5.2. to create a sampler for the unnormalized density $m(x)$ in Exercise 1, such that the density g is the Normal(-1,1)-distribution truncated to the interval [-1,2]. That is, g has mean and variance equal to -1 and 1, respectively. Notice that samples from the Normal(-1,1)-distribution can be easily created by using first a Normal(0,1) sampler and then adding -1 to the generated values. Further, samples from the truncated distribution are again obtained by the method described in Section 3.4. The density function g equals here

$$g(x) = \frac{\frac{1}{\sqrt{2\pi}} \exp(-.5(x+1)^2)}{\int_{-1}^2 \frac{1}{\sqrt{2\pi}} \exp(-.5(x+1)^2) dx} \approx \frac{1}{0.49865\sqrt{2\pi}} \exp(-.5(x+1)^2) \quad (1)$$

Identify a suitable majoring constant M for the rejection sampler and compare the efficiency of the sampler to that designed in Exercise 1. Also, compare the convergence of the same density characteristics as in Exercise 2. The unnormalized target density curve (solid) and the majorant curve gM (dotted) with $M = 10$ are shown in the figure below.

