Consider the potential use of the rejection algorithm to use standard Cauchy variables (i.e. ones with pdf $g(x) = \frac{1}{\pi(1+x^2)}$) to generate a standard normal variable, i.e. with pdf

$$q(x) = \frac{1}{\sqrt{2\pi}} \exp -\frac{1}{2} x^2$$

Note that $q(x)$ is constant and $\to 0$ as $x \to \pm \infty$. It is thus bounded and plotting shows that the ratio is bounded by 1.6.

So one could use rejection sampling with $M = 1.6$ to generate a standard normal variable.