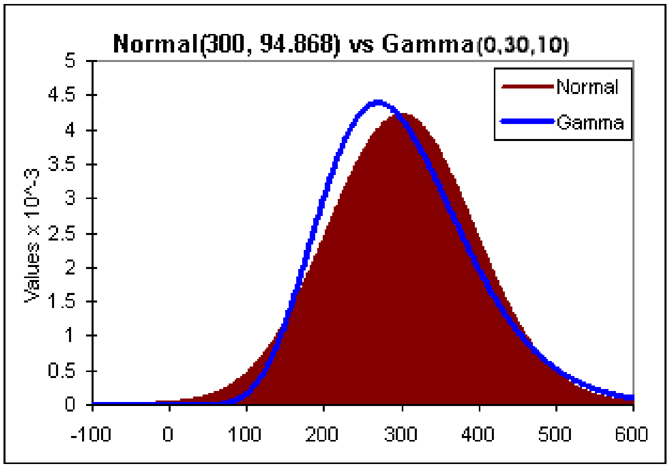
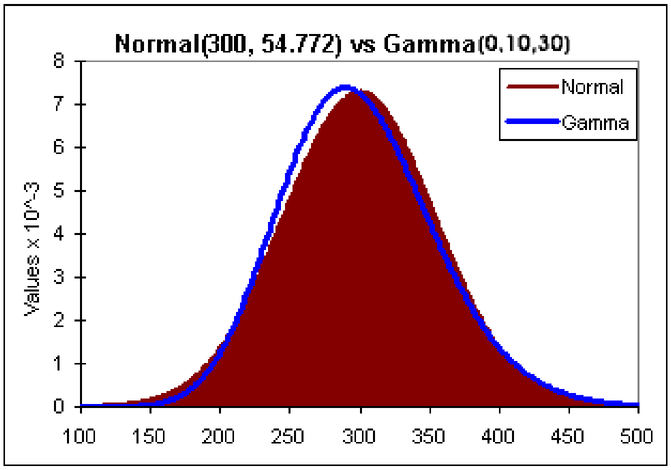
Normal approximation to the Gamma distribution

The Gamma(0, *b*, *a*) distribution returns the "time" we will have to wait before observing *a* independent Poisson events, where one has to wait on average *b* units of "time" between each event. The "time" to wait before a single event occurs is a Gamma(0,*b*,*1*) = Exponential(1/*b*) distribution, with mean *b* and standard deviation *b* too. The Gamma(0, *b*, *a*) is thus the sum of *a* independent Exponential(1/*b*) distributions, so Central Limit Theorem tells us for sufficiently large *a* (>30, for example), we can make the approximation:

Gamma(0, *b*, *a*) » Normal$(\alpha\beta, \sqrt{\alpha}\beta)$





The Gamma(0, *b*, *a*) distribution has mean and standard deviation equal to *ab* and *a*½*b* respectively, which provides a nice check to our approximation.