BINOMIAL DISTRIBUTION VS NORMAL DISTRIBUTION

Why approximate with a normal distribution, when a binomial distribution calculator function produces EXACT probabilities?

As with so many things in AP Statistics, we are focusing on the teaching of concepts. (E.g., in practice NONE of our methods for assessing normality work with the sample sizes we typically see in textbooks.) In the case of the normal as an approximation to the binomial, I think the answer is, render unto the calculator what is the calculators!

However, it is the case that in statistics many discrete distributions are approximated by continuous distributions. (Come to think of it, do we EVER get anything other than discrete numbers when we sample??) I think the important thing about the normal approximation to the binomial isn't the normal and the binomial, it is that we make compromises with discrete reality by using continuous approximating functions, and the normal for binomial is just one example.

The most prevalent cases that I'm (only slightly) familiar with are nonparametric statistics. Most of those seem to be replete with derivations involving serious combinatorics, and the many different tables describing the sampling distributions are -- to my easily befuddled brain -- seriously grim. But when I flip the page over I see something like, "If n > magic number, the sampling distribution of this statistic is normalish, or t-ish, or X2-ish" I breathe a little easier…

Part of it also that our inference procedures are based on this approximation. We could always use a binomial distribution for cases involving sample proportions, but when we create a CI or do a HT, we are using techniques that depend on the normal approximation even when we use the calculator.