Application exercise: 2.3 Binomial distribution

Scottish independence

A September 16, 2014 Surveynation poll suggests that 44% of Scots favor the Scottish independence, 48% are against it, and 8% are undecided. Suppose we have a random sample of 1,000 Scots.

1. Calculate a range for the plausible number of Scots in this sample who believe Scotland should be an independent country.
2. In order for Scotland to be an independent country there needs to be a majority of Yes votes in the referendum. Suppose a random sample of 1,000 Scots were to vote. Assuming that all those who said they were undecided on the poll vote No, what is the probability that majority in this sample (501 or more) vote Yes? Answer this question using two approaches:
   (a) Use the exact binomial probabilities. *Hint:* Computation will be your friend for this part, you *don't* want to do this by hand.
   (b) Use the normal approximation to the binomial.