## Portfolio 2. Estimating CogSci knowledge

1. *What's Riccardo's estimated knowledge of CogSci? What is the probability he knows more than chance (0.5)?*

Riccardo’s knowledge of CogSci as estimated by using grid approximation (Figure 1a) and by using quadratic approximation (Figure 1b) is presented below. Riccardo’s estimated knowledge is visualized as a normal distribution peaking at 0.5 with a standard deviation of 0.2, which means a lot of uncertainty about plausibility of different knowledge parameters.

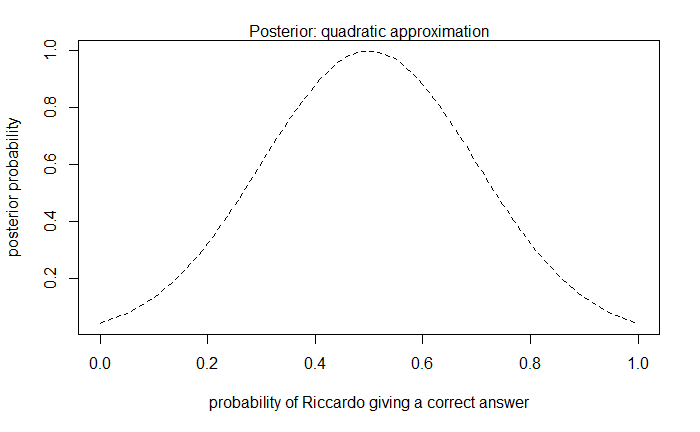
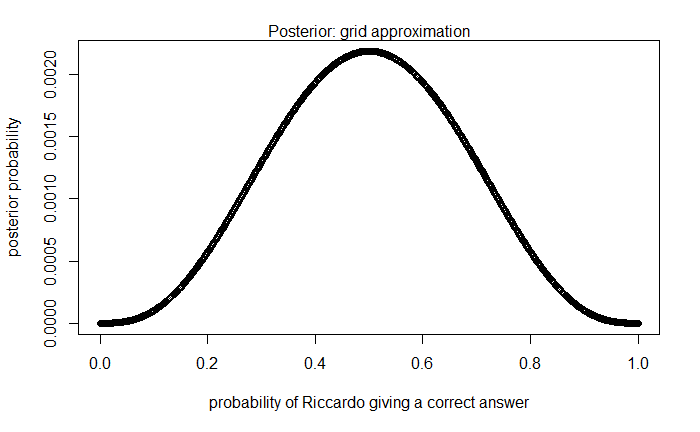


Figure 1. Posterior probability distribution estimated by a) Grid Approximation and b) Quadratic Approximation

By adding up the posterior probability where Riccardo’s knowledge is better than chance (i.e. knowledge parameter > 0.5), I found that the probability that he knows more than chance is 0.5.

1. *Estimate all the teachers' knowledge of CogSci. Who's best? Use grid approximation. Comment on the posteriors of Riccardo and Mikkel.*

*2a. Produce plots of the prior, and posterior for each teacher.*

1. Change the prior. Given your teachers have all CogSci jobs, you should start with a higher appreciation of their knowledge: the prior is a normal distribution with a mean of 0.8 and a standard deviation of 0.2. Do the results change (and if so how)?

3a. Produce plots of the prior and posterior for each teacher.

1. You go back to your teachers and collect more data (multiply the previous numbers by 100). Calculate their knowledge with both a uniform prior and a normal prior with a mean of 0.8 and a standard deviation of 0.2. Do you still see a difference between the results? Why?
2. Imagine you're a skeptic and think your teachers do not know anything about CogSci, given the content of their classes. How would you operationalize that belief?

- Knowledge of CogSci can be measured on a scale from 0 (negative knowledge, all answers wrong) through 0.5 (random chance) to 1 (awesome CogSci superpowers)

If I thought that they do not know anything about CogSci, I would expect all of the scores be in the interval between negative knowledge and random chance (0 and 0.5)

1. Optional question: Can you estimate the difference between Riccardo's estimated knowledge and that of each of the other teachers? Would you deem it credible (that is, would you believe that it is actually different)?