

## An Elementary Examination

On the 13th of May I returned from my afternoon walk to find Sherlock Holmes gazing out the window, pipe in mouth, and looking quite satisfied with himself. I was taken aback; he had vanished at the end of December with no indication of his destination and no indication of his return. I went out and bought a newspaper every afternoon, hoping that I would not find an obituary there. Although more than 150 days had passed with no such announcement, I maintained a small posterior belief that he had met his demise on some godforsaken cliff in South America. Needless to say, I was so astonished that I nearly dropped today's paper upon seeing him.

"I think you will fail again to find evidence of my untimely end, Watson," he said, "but you are welcome to look and perform your Bayesian update."

"I think I will defer to your superior knowledge, Mr. Holmes."

"As you wish. We have a case, Watson! A rather sticky business. It will require a working knowledge of both Detection and Estimation. How have your studies progressed?"

"How did you know?" When Holmes did not return, I had enrolled in a postgraduate course on those selfsame topics – I had thought that with some extra tutoring I might be able to hold over the business in the case of his return.

"Ah, Watson, deduction is more than simply a matter of applying rules – you have to look at the evidence! Behold, my observations  $\mathbf{x}$ : both volumes of Kay on the end table. A bit heavy for after-dinner reading, no? Further: a scrap of paper here with on which is written 'Sakai' and a series of characters which I highly suspect is a password. Really, Watson, you ought to know better than to write such things down."

"Dash it all, Holmes, I..."

"The maximum likelihood estimate of the parameter  $\theta$ ," Holmes announced, cutting me off, "is that you have decided to further your education by subjecting yourself to some beastly course involving applied probability. I ask you again, how have your studies progressed?"

"Well enough, I suppose."

"Supposition is not enough. Let us see if you are up for an elementary examination – this case will require you to apply what you have learned. Time is of the essence. We have merely **3 hours** to solve this mystery. Come, Watson!" With that, he swept out of the room, barely pausing to snatch his coat from the rack.

"But where are we going?"

"To the casino!" His voice echoed up from the bottom of the stairs. "The carriage is waiting!"

I quickly tossed the newspaper on the divan and hurried after him.