A.1.1) $\hat{x}_t|m_t = \int p(x|m)x$

A.1.2) see code

A.1.3) $p(\hat{x}_t|x_t) = p(x|m)$, see code for plots

A.2.1) see code

A.2.2) see code

A.2.3) The PSE tells us the point at which you are equally likely to report test or reference (ie. completely guessing).

B.1.1-.3) see code

B.2.1) see code

B.2.3) The means are the same as the previous fits, but the sigmas seem to be smaller. I would've thought, intuitively that these two fits would be almost identical, but it is likely that I am fitting it incorrectly.

B.3.1) This fit requires 7 free parameters: 2 mu_t, 3 $sigmas_t$ (assuming the sigma of the reference to be constant) plus the mu and sigma of the prior.

B.3.2-.3) see code

B.3.4) It would be possible to test the significance of the fit prior and noise values (see code output for actual values) by designing an experiment that manipulates these two measures (eg. manipulate the prior by rewarding certain line lengths).

B.4.1) Bayes NLL: 127.7241, SDT NLL: 127.7241, CDF NLL: 127.4232

B.4.2) After computing the coin-flip (419.937) and empirical log likelihoods (188.152), it appears as if the fitted likelihoods fall outside of this range. This means that either something is wrong with my fits or I incorrectly computed the likelihoods of the boundary conditions.

B.4.3) Assuming my fits were done correctly, it appears as if all the models to a pretty good job of quantifying the data. Overall, the CDF model performed best, with the lowest NLL and only 6 parameters. The SDT and Bayes fit performed equally, but the SDT used two fewer parameters. That said, I think the SDT and Bayes fits may be incorrect.