6.1

Let X be a binomial random variable, $x \sim Binom(n, p)$. Show that the MLE of p is $\hat{p} = \frac{X}{n}$

6.2

Prove Proposition 6.1.2.

6.3

Suppose a random sample with $X_1 = 5, X_2 = 9, X_3 = 9, X_4 = 10$ is drawn from a distribution with $pdf = f(x;\theta) = \frac{\theta}{(2\sqrt(x)e^{-\theta\sqrt(x)})}, x > 0$. Use maximum liklihood to find an estimate of θ.

6.4

Let $X_1, X_2, \ldots, X_n$ be a random sample from the distribution with pdf = $f(x;\theta) = \frac{x^3 e^{-x/\theta}}{6\theta^4}$. Calculate the maximum likelihood estimate of θ.

6.5

Recall Theorm 6.1.3 where we found the maximum liklihood estimates for μ and $sigma$ for a random sample $X_1, X_2, \ldots, X_n \sim N(\mu, \sigma^2)$.

a.) Suppose, instead, μ is unknown but σ is *known*. Find the maximum liklihood estimate of μ.

b.) Now suppose σ is unknown and μ is known. Find the MLE of σ

6.6