STA261 Summer 2018

Quiz 4

July 18th, 2018

First Name:_____

Last Name:_____

Student Number:_____

This quiz is out of 10 marks. Do ALL of your work on the back of the quiz, where the questions are. You can use the front for rough work, but nothing on the front will be marked, or even seen by the TAs.

If $X \sim Bernoulli(\theta)$ then $P(X = x) = \theta^x (1 - \theta)^{1-x}$, for $x = 0, 1$.

BELOW SPACE IS FOR ROUGH WORK. NOTHING WRITTEN HERE WILL BE READ OR MARKED.

1. (6 marks) Show that the maximum likelihood estimator (MLE) can depend on the data only through a function of a sufficient statistic. That is, if IID random variables $X_1 \ldots X_n$ have likelihood $L(\theta)$ and maximum likelihood estimator $\hat{\theta}(\mathbf{X})$, then $\theta(\hat{\mathbf{X}})$ is sufficient for θ.

2. (4 marks) Let $X \sim Bernoulli(\theta)$. Find the MLE for θ.