

# Problem Set 3

Math 466

due March 4, 2008

Chapter 2 Exercises 17,19,21,24,30,52-55 pages 47-51

1. Consider a simple random sample  $X_1, \dots, X_n$ , with each random variable having density

$$f(x|\theta) = (1 + \theta)x^\theta, \quad 0 \leq x \leq 1.$$

Show that  $T(\mathbf{x}) = \sum_{i=1}^n \ln x_i$  is a sufficient statistic.

2. In the previous problem, choose  $c$  so that  $cT(X)$  is an unbiased estimator of  $1/\theta$ . Find the Fisher information,  $I(\theta)$ .