

Rules: All quizzes and practice quizzes are open book and notes. If you can't answer the question you can give partial answers or change it to get some credit. You can guess at the answer to the first part of a question to get credit for the second part as indicated.

Write answers on a separate piece of paper or on the back of this page.

### PRACTICE QUIZ I

1. Suppose that  $X$  is a random variable with pdf  $f(x) = 2x/\theta^2$  if  $0 \leq x \leq \theta$  and  $f(x) = 0$  for other values of  $x$ . You take a sample of size 3. Suppose you get  $(X_1 = 3, X_2 = 1, X_3 = 8)$  (Always assume i.i.d.)

- (1) Find the MOM estimator for  $\theta$ .
- (2) Is this (your answer to (1)) an unbiased estimator for  $\theta$ ? If not, find an unbiased estimator.
- (3) What is the efficiency of this estimator (your answer to (1))? (Use  $\hat{\theta} = \bar{X}$  if you didn't get an answer to (1).)

2. Given that the mean is zero ( $\mu = 0$ ) Show that

$$\frac{1}{n} \sum_{i=1}^n X_i^2$$

is an unbiased estimator for  $\sigma^2$ .

3. (extra credit) From a sample of size 240 from a uniform distribution you get  $Y_{max} = 4000$ . Find a 95% confidence interval for  $\theta$  in the form

$$4000 < \theta < \hat{\theta}$$

Since no one had a calculator I said you can set the sample size to be 1.