Stat 479
Fall 2010
Quiz 7
October 25, 2009

1. An urn contains four balls. Each ball has a unique number on it. The numbers on the balls are 2, 4, 6, and 8.

   Two balls are drawn from the urn and the maximum number drawn is used to estimate the largest number on a ball in the urn.

   Calculate the Mean Square Error of this estimator.

Possible Draws	Probability	MAX
2, 4	1/6	4
2, 6		6
2, 8		8
4, 6		6
4, 8		8
6, 8		8

Distribution of $\hat{\theta}$

4	1/6
6	2/6
8	3/6

$$MSE = E(\hat{\theta} - \theta)^2$$

$$= (4-8)^2\left(\tfrac{1}{6}\right) + (6-8)^2(2/6) + (8-8)^2(3/6)$$

$$= \frac{16+8}{6} = \underline{\underline{4}}$$

2. You are given the following sample of claims:

X: 8, 10, 13, 14, 15, 15, 16, 18, 20, 25

The sum of X is 154 and the sum of X^2 is 2584.

H_0 is that $\mu_x = 13$ and H_1 is that $\mu_x \neq$ ~~17~~. 13

Calculate the z statistic, the critical value(s) assuming a significance level of 10%, and the p value. State your conclusion with regard to the Hypothesis Testing.

$$\bar{X} = \frac{154}{10} = 15.4$$

$$S_x^2 = \frac{\sum x^2 - N(\bar{x})^2}{N-1} = \frac{2584 - 10(15.4)^2}{9} = 23.6$$

$$z = \frac{15.4 - 13}{\sqrt{\frac{23.6}{10}}} = 1.56$$

Critical values ± 1.645

Therefore since $1.56 < 1.645$ we do not reject the null Hypothesis

p value $= (1 - .9406)(2) = .1188$