**MATH 4720 TEST 2 Mar. 13, 2017 NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Please show all work for partial credit. Point totals are shown to the left of each problem.

1. An instructor hypothesizes that the standard deviation of the final exam grades in her statistics class is larger for the male students than it is for the female students. The data from the final exam for the last semester are shown. Is there enough evidence to support her claim, using α = 0.01?

Males Females

(10)

1. Let .
2. Find the MME for .

(4)

1. Is the estimator you found in (a) consistent for ?

(7)

1. Let and for

Find the MLE for .

(12)

1. We are interested in testing . A random sample of size 40 is taken and . The rejection region is .
2. Compute α.

(5)

1. Compute β if

(5)

1. A check cashing service found that approximately 5% of all checks submitted to the service were bad. After instituting a check-verification system to reduce its losses, the service found that only 45 checks were bad in a random sample of 1124 that were cashed.
2. Does sufficient evidence exist to affirm that the check-verification system reduce the proportion of bad checks? Use α = 0.01.

(8)

1. What attained significance is associated with the test?

(3)

1. Let . Find the MVUE for

* Find a sufficient statistic for
* Find a function of the sufficient statistic that is unbiased for

(12)

1. A lumber company is interested in seeing if the number of board feet per tree has decreased since moving to a new location of timber. In the past, the company has had an average of 93 board feet per tree. The company would like to determine if average board feet per tree is different since changing locations. A random sample of 25 trees yields an average of 89 board feet per tree with a standard deviation of 20 board feet per tree. Assuming that board feet per tree are normally distributed, test the educator’s claim at α = 0.10 **using a confidence interval only!** State your conclusion.

(10)

1. Lowell Heiny would like to test if the average number of insect fragments in a 10 ounce sample of Heinz ketchup is more than 4. How large a sample is necessary to run a test with α = .02 and β = .10 if µ = 5? Assume σ = 2.

(12)

1. Let be a random sample from .

Find a uniformly most powerful test of size α = 0.05 for

(12)