Math 10 – Homework 4

Name:

Lecturer:

**Instructions**

* Type your answers and paste images directly into this document.
* Or add additional space, print this out, and fill it in by hand.
* You will need to use a calculator for this homework.
* Print out and hand in homework in class on Tuesday.
* You may collaborate on the homework but you must write it up yourselves.

**Question 1**

(10 pts) An exit poll of 1000 randomly selected voters found that 515 favored candidate A. Is the race too close to call based on this random sample alone? Answer this question by performing an appropriate test of hypothesis at 1% level of significance. *(Hint: use the Normal approximation to the Binomial distribution, Luke)*

**Question 2**

(10pts) The time needed for college students to complete a certain maze follows a normal distribution with a mean of 45 seconds. To see if the mean time time μ (in seconds) is changed by vigorous exercise, we have a group of nine college students exercise vigorously for 30 minutes and then complete the maze.

The sample mean and an estimator of the standard deviation, calculated from the collected data, is 49.2 seconds and 3.5 seconds respectively. Use these data to perform an appropriate test of hypothesis at 5% level of significance

**Question3**   
(10 pts) A research team is interested in the difference between serum uric acid levels in patients with and without Down's syndrome.

In a large hospital for the treatment of the mentally retarded, a sample of 15 individuals with Down's syndrome yielded a mean of 4.5 (mg per 100ml). In a general hospital a sample of 12 normal individuals of the same age and sex were found to have a mean value 3.4 (mg per 100ml).

If it is reasonable to assume that the two populations of values are normally distributed with variances equal to 1 and 1.5 respectively, find the 95 percent confidence interval for difference of means

Note: the sampling distribution for the difference between two means is normal when the population variances are known.

**Question 4**

(10 pts) Construct a 90% confidence interval for the difference of population means, for two normally distributed population with the same but unknown variance. Assume that these two samples, each taken from a different population, are independent.

Sample 1: sample mean = 49.37, sample SD = 4.89, n = 16

Sample 2: sample mean = 52.13, sample SD = 5.38, n = 16

“Sample SD” is the estimator of the standard deviation, calculated using the sample.