**HW3: Normal Distributions**

1. Suppose that, untreated, the mean length of illness for a certain type of influenza is 15 days, with a standard deviation of 2. Suppose further that the distribution of the lengths of illness is normal. Assume that these are parameters. Answer the following question in terms of these data:
2. What proportion of the people who contract this disease and are not treated for it will be ill less than 10 days? (1 pt)
3. What is the probability of selecting an untreated person at random who has contracted the disease and obtaining one who was ill 13 days or more? (1 pt)
4. What proportion of those persons who contract the disease and received no treatment are ill between 12 and 14 days? (1 pt)
5. What is the probability that for the 25 people in Taipei who contracted the disease and were not treated for it, the mean length of their illnesses was between 14 and 16 days? (1 pt)
6. Suppose that entering college freshmen in a large number of colleges and universities complete a test to measure their English proficiency. Suppose further that this test has been used over a period of years and the mean score received by all entering freshmen over the last 10 years was 65.5 with a standard deviation of 10.5. The distribution of scores is approximately normal. Assume that these are parameters.

You select a random sample of 49 entering freshmen this year at NTU and collect data on their performance on this test. Their mean score is 68.0.

1. Does this mean score differ significantly from the overall mean reported above? Use the 0.05 level to determine statistical significance. (Total 3 pts--State H0 & Ha (1 pt), Z-value (1 pt), Test result: Reject or Accept H0 (1 pt))
2. Precisely interpret the meaning of the statistical findings to question (1) above. (1 pt)

Now suppose that this sample of 49 students had a mean score of 70.0.

1. Does this mean score differ significantly from the overall mean? Use the 0.05 level to determine statistical significance. (Total 3 pts--State H0 & Ha (1 pt), Z-value (1 pt), Test result: Reject or Accept H0 (1 pt))
2. Precisely interpret the meaning of the statistical findings in question (3) above. (1 pt)