Sheet 7 (Hypothesis Test of The Single Population Mean)

1. A random sample of 64 bags of white Cheddar popcorn weighed, on average, 5.23 ounces with a standard deviation of 0.24 ounces. Test the hypothesis that μ = 5.5 ounces against the alternative hypothesis, $\mu < 5.5$ ounces at the 0.05 level of significance.

2. An electrical firm manufactures light bulbs that have a lifetime that is approximately normally distributed with a mean of 800 hours and a standard deviation of 40 hours. Test the hypothesis that μ = 800 hours against the alternative $\mu \neq 800$ hours if a random sample of 30 bulbs has an average life of 788 hours.

3. In a research report by Richard H. Weindruch of the UCLA Medical School, it is claimed that mice with an average life span of 32 months will live to be about 40 months old when 40% of the calories in their foods are replaced by vitamins and protein. Is there any reason to believe that $\mu < 40$ if 64 mice that are placed on this diet have an average life of 38 months with a standard deviation of 5.8 months?

4. The average height of females in the freshman class of a certain college has been 162.5 centimetres with a standard deviation of 6.9 centimetres. Is there reason to believe that there has been a change in the average height if a random sample of 50 females in the present freshman class has an average height of 165.2 centimetres? Assume the standard deviation remains the same.

5. It is claimed that an automobile is driven on the average more than 20,000 kilometres per year. To test this claim, a random sample of 100 automobile owners are asked to keep a record of the kilometres they travel. Would you agree with this claim if the random sample showed an average of 23,500 kilometres and a standard deviation of 3900 kilometres?

6. In the American Heart Association journal Hypertension, researchers report that individuals who practice Transcendental Meditation (TM) lower their blood pressure significantly. If a random sample of 225

male TM practitioners meditate for 8.5 hours per week with a standard deviation of 2.25 hours, does that suggest that, on average, men who use TM meditate more than 8 hours per week?

7. Test the hypothesis that the average content of containers of a particular lubricant is 10 litters if the contents of a random sample of 10 containers are 10.2, 9.7, 10.1, 10.3, 10.1,9.8, 9.9, 10.4, 10.3, and 9.8 litters. Use a 0.01 level of significance and assume that the distribution of contents is normal.

8. According to a dietary study, a high sodium intake may be related to ulcers, stomach cancer, and migraine headaches. The human requirement for salt s only 220 milligrams per day, which is surpassed in most single servings of ready-to-eat cereals. If a random sample of 20 similar servings of certain cereal has a mean sodium content of 244 milligrams and a standard deviation of 24.5 milligrams, does this suggest at the 0.05 level of significance that the average sodium content for a single serving of such cereal is greater than 220milligrams? Assume the distribution of sodium contents to be normal.

9. A random sample of 100 recorded deaths in the United States during the past year showed an average life span of 71.8 years. Assuming a population standard deviation of 8.9 year. Does this seem to indicate that the mean life span today is greater than 70 years? Use a 0.05 level of significance.

10. A random sample of 36 drinks from a soft-drink machine at the Helton Hotel has an average content of 7.4 ounces and a standard deviation of 0.48 ounces. Test the hypothesis that $\mu = 7.5$ ounces against the alternative $\mu < 7.5$ ounces at the 0.05 level of significance.