C

Math 123- Statistics

Illowsky – Chapt. 9 & 10
Larson – Chapt. 7 & 8

Hypothesis Test Practice

Types of Hypothesis Tests:

1 sample mean t	1 sample mean z 1 sample prop z
2 sample means t (independent samples, variances equal)	2 sample means z 2 sample prop z
2 sample means t (independent samples, variances not equal)	Chi-Square Variance
2 sample means t (dependent samples, paired data)	Chi-Square Standard deviation

1. An experienced farmer says that the standard deviation for the number of lettuce plants that can grow in one acre is at most 59 plants. The soils department comes to the farm and randomly selects 15 acres and finds that the number of lettuce plants per acre has a standard deviation of 62 plants. Is there enough evidence to reject the farmer's claim at a 10% level of significance?

2. A simple random sample of 41 8th grade students found that the mean score on an exam is 250 with a sample standard deviation of 55. The school administration claims that the population mean for the school is less than 265. Is there enough evidence to support the claim? Use the P-value method.

3. Mars Inc., makers of M&M candies, claims that they produce M&Ms with the following color distribution: Brown: 30% Red: 20% Yellow: 20% Orange: 10% Green: 10% Blue 10%
A SRS of M&Ms bags were selected from the grocery store shelf and produced the following color counts: Brown: 120 Red: 57 Yellow: 63 Orange: 42 Green: 27 Blue: 21
Conduct a hypothesis test to see if the manufacturer's claim for the proportion of orange M&Ms is correct.

4. A SRS of 25 daisies in Arroyo Grande shows that the average number of petals on the flower is 13 with a population standard deviation of 2.5. Assume that the Arroyo Grande data is normally distributed. A SRS of 37 daisies in Atascadero shows that the average number of petals on the flower is 17 with a population standard deviation of 1.7. Determine if there is enough evidence to show that the average number of petals on daisies in Atascadero is the same as that of Arroyo Grande. Use the P-value method.

5. A simple random sample of 20 people found that the average amount earned during the summer was \$5800 with a population standard deviation of \$350. The city produced a study claiming that the average salary during the summer is not \$6000. Test the claim using $\alpha = .01$.

6. A juice box company estimates that the variance of the number of fluid ounces in one box is .8 ounces. An independent company is asked to test this claim and finds that a random sample of 83 juice boxes has a variance of .71 ounces. Using a level of significance of .01 is there enough evidence to reject the manufacturer's claim assuming that the data is normally distributed?

7. A study is done on a SRS of 25 dogs that had their paws burned in the fires in southern California. For each dog, the left front paw was treated with an herbal gel and the right front paw was treated with a traditional burn gel. The burns on each paw are examined after two weeks and the mean difference in the severity of the burns in the left paw and right paw was 5.8 with a sample standard deviation of differences of 1.3. Is there enough evidence to show that the herbal gel treatment did not work equally as well as the traditional burn gel treatment assuming that both sets of data are approximately normal?

8. In a SRS of 10572 college students taken in the year 1996, 2358 said that they had smoked in the last 30 days. In another SRS of 8551 college students taken in the year 2006, 2437 said they had smoked in the last 30 days. Can you reject the claim that the proportion of college students who said they had smoked in the last 30 days in 1996 was at least that of 2006? Use rejection regions.

9. A SRS of 33 daisies in Arroyo Grande shows that the average number of petals on the flower is 13 with a sample standard deviation of 2.57. A SRS of 37 daisies in Atascadero shows that the average number of petals on the flower is 17 with a sample standard deviation of 2.52. Assume that the population variances are equal. Determine if there is enough evidence to show that the average number of petals on daisies in Atascadero is at least that of Arroyo Grande. Use rejection regions.

10. While attending many basketball games around the country, James notices that the heights of basketball players vary dramatically in different parts of the country. James decides to randomly select basketball players from two different states and record the heights of those players. James wants to take this information and determine if the players from Nebraska are taller on average than the players from New Jersey. The heights of the randomly selected players are shown in the table below. All heights are rounded to the nearest inch, both sets of data are approximately normal, and the population variances are not equal.

Nebraska	72	73	70	78	69	75	75	76	71	73	79	81	73	70	75	76	71	72	65
New Jersey	70	72	71	71	73	75	76	74	72	72	70	67	76	73	71	70	74		

11. The data is the daily high temperature during January 2000 in Chicago, IL. The National Weather Center claims that the average temperature in Chicago during January is less than 30 degrees. Is there enough evidence to support the claim at a 10% level of significance?
33, 31, 25, 22, 38, 51, 32, 23, 23, 34, 44, 43, 47, 37, 27, 25, 28, 35, 21, 24, 20, 19, 23, 27, 24, 13, 18, 28, 17, 25, 31

12. While attending many basketball games around the country, James notices that the heights of basketball players vary dramatically in different parts of the country. James decides to randomly select basketball teams from two different states and record the heights of all players on those two teams. James wants to take this information and determine if the players from Nebraska are taller on average than the players from New Jersey. The summary statistics from the randomly selected teams are shown in the table below. All measurements are in inches and both sets of data are approximately normal. The Nebraska team consists of 19 people and the New Jersey team consists of 17 people.

	Mean Height	Standard Deviation
Nebraska	73.368	3.7022
New Jersey	72.176	2.307

Type of Test

1. Chi-Square standard deviation
2. 1 sample t test for means
3. 1 sample proportion
4. 2 sample z test for means
5. 1 sample z test for means
6. Chi-Square variance
7. 2 sample t test for means (paired data)
8. 2 sample proportion
9. 2 sample t test for means (pooled)
10. 2 sample t test for means (not pooled)
11. 1 sample z test for means
12. 2 sample z test for means