

MATH 160 Chapter 9

PROBLEM 1

The Monroe Medical Group studied the ailments of adults with diabetes. Of 8750 adults who are diabetic, 2100 have high cholesterol. Of 12350 adults who are not diabetic, 1482 have high cholesterol. Find the percentage of adults with high cholesterol for both groups.

Diabetic: $n_1 = 8750, x_1 = 2100, \hat{p}_1 = ?$

Not Diabetic: $n_2 = 12350, x_2 = 1482, \hat{p}_2 = ?$

Construct a 99% confidence interval for the difference between the two population proportions of adults with and without diabetes who have high cholesterol. (write your answer as a percentage then round to the tenths place)

Is there a significant difference between the two groups? Do diabetics have high cholesterol when compared to non diabetics? **Explain your answer by using the confidence interval from above.**

PROBLEM 2

A study was conducted to determine whether magnets are effective at treating back pain. One group was given the magnet treatment, while the other group was given the sham treatment. The results are shown below where measurements are centimeters on a pain scale. Do not assume the population standard deviations are equal.

Magnet:

$$n_1 = 23, \bar{x}_1 = 0.47, s_1 = 0.95$$

Sham: (similar to a placebo)

$$n_2 = 25, \bar{x}_2 = 0.32, s_2 = 1.45$$

Construct a 95% confidence interval for the difference between the two population means. Round to the thousandths place.

Based on the results, does it appear that the two populations have different means? EXPLAIN your answer using the interval from the previous answer.

PROBLEM 3

A study was conducted to determine whether listening to Mozart improves scores on a math quiz. A random sample of five students took math quizzes, first before and then after listening to Mozart. The results are shown below. Construct a 99% confidence interval for the mean difference.

| | | | | | |
|--------|----|----|----|----|----|
| Before | 75 | 50 | 80 | 85 | 95 |
| After | 85 | 45 | 85 | 95 | 95 |

Based on the results, does it appear that listening to Mozart improves scores on a math quiz? EXPLAIN your answer using the confidence interval from above.

PROBLEM 4

A nutritionist claims that a particular exercise program will help participants lose weight after one month. The table shows the weights of 6 adults before the exercise program and after the exercise program. At a 0.10 significance level, can you conclude that the exercise program helps participants lose weight? Test the claim that the exercise program helps participants lose weight.

| | | | | | | |
|----------------|-----|-----|-----|-----|-----|-----|
| Before program | 157 | 165 | 150 | 251 | 140 | 137 |
| After program | 150 | 169 | 150 | 232 | 138 | 145 |

Is this particular exercise program effective in helping participants lose weight after just one month ?

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PROBLEM 5

Among 2600 randomly selected male car occupants over the age of 8, 78% wear seatbelts. Among 2500 randomly selected female car occupants over the age of 8, 84% wear seatbelts. Use a 0.05 significance level to test the claim that both genders have the same rate of seatbelt use. Does there appear to be a gender gap?

PROBLEM 6

Using the data below and a 0.05 significance level, test the claim that the mean amount of tar in filtered cigarettes is less than the mean amount of tar in unfiltered cigarettes. Do not assume the population standard deviations are equal. All measurements are in milligrams.

| | | | | | | | | | |
|------------|----|----|----|----|----|----|----|----|---|
| Filtered | 18 | 16 | 17 | 14 | 16 | 3 | 17 | 18 | 9 |
| Unfiltered | 19 | 21 | 22 | 26 | 23 | 25 | 19 | | |

Is there sufficient evidence to support the claim that the mean amount of tar in filtered cigarettes is less than the mean amount of tar in unfiltered cigarettes?