

Math 373 Hw 20 Recommended problems, don't turn this in.

Hw 340: 9.14, 9.18. 346: 9.24, 9.28. Rec 340: 9.15, 9.17, 9.19. 346: 9.25, 9.27, 9.29.

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9.15. Random samples of 36 and 45 observations are drawn from populations 1 and 2.

| | Sample 1 | Sample 2 |
|------------------|----------|----------|
| Sample size | 36 | 45 |
| Sample mean | 1.24 | 1.31 |
| Sample std. dev. | 0.056 | 0.054 |

Do the data present sufficient evidence to indicate that the mean for population 1 is smaller than the mean of population 2?

9.17. An experiment was planned to compare the mean time in days required to recover from a common cold for persons given a daily dose of 4 milligrams of vitamin C versus those who were not given a vitamin supplement. Suppose that 35 adults were randomly selected for each treatment category and that the mean recovery times and std. dev. are as follows:

| | No vitamin | 4mg vitamin C |
|------------------|------------|---------------|
| Sample size | 35 | 35 |
| Sample mean | 6.9 | 5.8 |
| Sample std. dev. | 2.9 | 1.2 |

(a) Your research objective is to show that the use of vitamin C reduces the mean time required to recover from a common cold. give the null and alternate hypotheses for the test. Is this a one- or two-tailed test?

(b) Should we accept the null hypothesis at the $\alpha=.05$ level?

9.19. Analyses of drinking water samples for 100 homes in each of two different sections of a city gave the following means and std. devs. of lead levels in parts per million.

| | Section 1 | Section 2 |
|------------------|-----------|-----------|
| Sample size | 100 | 100 |
| Sample mean | 34.1 | 36 |
| Sample std. dev. | 5.9 | 6 |

(a) Calculate the test statistic and its p-value to test for a difference in the two population means. use the p-value to evaluate the statistical significance of the results at the 5% level.

(b) Use a 95% confidence interval to estimate the difference in the mean lead levels for the two sections.

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9.25. A random sample of $n = 1400$ observations from a binomial population produced $x = 529$.

(a) If your research hypothesis is that p differs from .4, what hypotheses should you test?

(b) Calculate the test statistic and its p-value. Use the p-value to evaluate the statistical significance of the results at the 1% level.

(c) Is there sufficient evidence to indicate that p is difference from .4?

9.27. It has been reported that approximately 60% of U.S. households have two or more TVs and that at least half of Americans sometimes watch TV alone. Suppose that $n=75$ households are sample and, of the sampled, 49 had two or more TVs and 35 respondents sometimes watch TV alone.

(a) Two claims can be tested using the sample information. What are the two sets of hypotheses to be tested?

(b) Do the data present sufficient evidence to contradict the claim that at least half of Americans sometimes watch TV alone?

(c) Do the data present sufficient evidence to show that the 60% figure is incorrect?

9.29. Of those women who are diagnosed to have early-stage breast cancer, one-third eventually die of the disease. Suppose a community public health department instituted a screening program to provide for the early detection of breast cancer and to increase the survival rate p of those diagnosed to have the disease. A random sample of 200 women was selected from among those who were periodically screened by the program and who eventually were diagnosed to have the disease. Let x represent the number of those in the sample who survive the disease.

(a) If you wish to detect whether the community screening program has been effective, state the null hypothesis.

(b) State the alternative hypothesis.

(c) If 164 women in the sample of 200 survive the disease, can you conclude that the community screening program was effective? Test using $\alpha = .05$.

(d) Find the p-value for the test.