

Chapter 7-10 practice problems

Essentials of Statistics, Triola

- 1) When people smoke, the nicotine they absorb is converted to cotinine, which can be measured. A sample of 40 smokers has a mean cotinine level of 172.5 and a standard deviation of 109.5. Assuming the levels of cotinine are normally distributed, construct a 95% confidence interval estimate for the population mean of the cotinine level of all smokers.

(Round your answer to the thousandths place.)

- 2) DETERMINING SAMPLE SIZE: “An economist wants to estimate the mean income for the first year of work for college graduates who have taken a statistics course. How many such incomes must be found if we want to be 99% confident that the sample mean is within \$400 of the true population mean? (This means that the margin of error is 400) **Assume** that a previous study has revealed that for such incomes that the population standard deviation is equal to \$6250
(Round Z to the thousandths place)

(Round your final answer by using the round off rule for Sample Sizes)

A researcher wishes to determine whether the salaries of professional nurses employed by private hospitals are higher than those of nurses employed by government-owned hospitals. She selects a sample of nurses from each type of hospital and calculates the means and standard deviations of their salaries.

private: $n_1 = 32, \bar{x}_1 = \$26,800, s_1 = \600

government: $n_2 = 40, \bar{x}_2 = \$25,400, s_2 = \450

3) Construct a 95% confidence interval for the difference between the two population means .

4) Is there a significant difference between the two groups? Does one hospital really pay more than the other? Explain your answer by using the confidence interval from above.

A random sample of 100 babies is obtained, and the mean head circumference is found to be 40.6 cm. Assuming that the population standard deviation is known to be 1.6 cm, use a 0.05 significance level to test the claim that the mean head circumference is equal to 40.0 cm.

- 5) Which parameter is being tested here? a) μ b) σ c) P
- 6) Where does the claim go? H_0 or H_1
- 7) The null hypothesis is _____
- 8) The alternate hypothesis is _____
- 9) The test statistic is

- 10) The critical value is

- 11) The p-value is

- 12) Which is the correct conclusion for the problem. _____
 - a) The sample data support the claim that the mean head circumference is equal to 40.0 cm.
 - b) There is not sufficient sample evidence to support the claim that the mean head circumference is equal to 40.0 cm.
 - c) There is sufficient evidence to warrant rejection of the claim that the mean head circumference is equal to 40.0 cm.
 - d) There is not sufficient evidence to warrant rejection of the claim that the mean head circumference is equal to 40.0 cm.

With multiple lines for its various windows, the Jefferson Valley Bank found that the standard deviation for normally distributed waiting times on Friday afternoons was 6.2 min. The bank experimented with a single main waiting line and found that for a simple random sample of 25 customers, the waiting times have a standard deviation of 3.8 min. Use a significance level of 0.05 to test the claim that a single line causes lower variation among the waiting times. In other words, Test that a single line results in a lower variation of waiting times when compared to multiple lines

13) What is the null hypothesis? _____

14) What is the alternate hypothesis? _____

15) Find the test statistic

16) The critical value is

17) **Which is the correct conclusion for the problem.** _____

- a) The sample data support the claim that a single line causes lower variation among the waiting times.
- b) There is not sufficient sample evidence to support the claim that a single line causes lower variation among the waiting times.
- c) There is sufficient evidence to warrant rejection of the claim that a single line causes lower variation among the waiting times.
- d) There is not sufficient evidence to warrant rejection of the claim that a single line causes lower variation among the waiting times.

A local elementary school claims that its new tutoring program helps students raise their scores on math tests. The table shows the scores of 6 students before the implementation of this new tutoring program and the scores after the implementation of the new tutoring program. At a 0.10 significance level, can you conclude that the tutoring program helps students raise their math test scores? Test the claim that the tutoring program helps students get better scores on their math tests.

Before program	80	75	30	68	81	78
After program	80	80	70	75	95	75

18) Which statement represents the claim? Circle your choice below.

- a) $U_d = 0$ b) $U_d > 0$ c) $U_d < 0$ d) $U_d \neq 0$,
 e) $U_1 = U_2$ f) $U_1 > U_2$ g) $U_1 < U_2$ h) $U_1 \neq U_2$

19) The null hypothesis is _____

20) The alternate hypothesis is _____

21) The test statistic is _____

22) The critical value is _____

23) The p-value is _____

24) Choose one. a) FAIL TO REJECT H_0 b) REJECT H_0 .

25) Is this particular tutoring program effective in helping students raise their math test scores ?

When nicotine is absorbed by the body, cotinine is produced. A measurement of cotinine in the body is therefore a good indicator of how much a person smokes. Listed below are the reported numbers of cigarettes smoked per day and the measured amounts of nicotine (in ng/mL)

X Cigarettes smoked per day	10	15	20	2	7	4
Y Cotinine level	283	174	350	1.85	43.4	75.6

Round to the thousandths place

26) Find the value of the linear correlation coefficient (r)

27) Is there a significant linear correlation? (This is not just a “yes” or “no” question, show **all steps in a hypothesis test** leading to your answer)

28) If a significant linear correlation exists, find the regression **equation**. If there is no significant linear correlation, find \bar{y} .

29) Find the best predicted cotinine level if a person smokes 8 cigarettes per day.

A medical researcher claims that less than 23% of U.S. adults are smokers. In a random sample of 200 adults, 22.5% say that they are smokers. Test the claim that the proportion of adults who smoke is less than 23%. Use a significance level of .10

30) The null hypothesis is _____

31) The alternate hypothesis is _____

32) The test statistic is _____

33) The critical value is _____

34) The p-value is _____

35) Choose one. a) FAIL TO REJECT H_0 b) REJECT H_0 .

36) What is your conclusion? Write it out using the “wording of final conclusion” table.