Lesson #64 · Topic · · Practice

Name _____

1. A polling organization wants to estimate the proportion of registered voters in a city who support a proposed public transportation tax. A random sample of 600 voters is surveyed, and 342 say they support the tax.

   a. Is the response variable categorical or quantitative? How do you know?

   b. How many samples or groups are there?

   c. Should the polling organization construct a confidence interval or perform a hypothesis test? Explain.

   d. Identify the correct inference procedure. Define any parameters used.

2. A cereal company claims that the mean weight of its cereal boxes is 16 ounces. A quality inspector believes the population mean weight of all cereal boxes produced by this company is less than 16 ounces. A random sample of 30 boxes yields a sample mean of 15.82 ounces and a sample standard deviation of 0.31 ounces.

   a. Identify the correct inference procedure.

   b. Define the parameter.

   c. State appropriate hypotheses, if applicable. If not applicable, explain why.

3. A nutritionist wants to estimate the mean daily sodium intake, in milligrams, of adults in a county. In a random sample of 50 adults, the mean was 2,870 mg, and the standard deviation was 640 mg.

   a. Classify the type of variables and type of study.

   b. Identify the correct inference procedure. Be sure to define the parameter.

   c. Check the appropriate conditions.

4. A teacher wants to estimate with 90% confidence the mean change in quiz scores after students attend a tutoring session. Each of 15 students takes a quiz before and after tutoring. Their quiz scores improved by a mean of 6.4 points with a standard deviation of 8.0 points.

   a. Identify the correct inference procedure. Be sure to define the parameter.

   b. Assume conditions for inference were met. Make the appropriate calculations for the procedure identified in part (a).

5. A marketing analyst wants to estimate the difference in the proportion of customers who prefer online shopping between urban residents and rural residents. Independent random samples of urban and rural residents are selected, and the results are shown in the table.

	Yes	No	Total
Urban	204	96	300
Rural	135	115	250
Total	339	211	550

Construct and interpret a 95% confidence interval for the true difference in the population proportions of urban and rural customers who prefer online shopping.

a. Identify the correct inference procedure. Be sure to define the parameter.

b. Assume conditions for inference were met. A 95% confidence interval was calculated to be (0.059, 0.221). Make a conclusion in the context of the problem.

6. A school administrator selects a random sample of 180 students and records each student's grade level and preferred lunch option.The results are shown in the table.

	Pizza	Salad	Sandwich	Total
9th grade	29	17	21	67
10th grade	16	19	18	53
11th grade	14	22	24	60
Total	59	58	63	180

The administrator wants to determine if there is convincing statistical evidence of an association between grade level and preferred lunch option. Which of the following inference procedures would be best used to investigate this question?

A) Two-sample z -test for $p_1 - p_2$

B) χ^2 test for homogeneity

C) One-sample z -test for p

D) χ^2 test for independence

7. A researcher wants to estimate the difference in mean daily screen time between middle school and high school students. Independent random samples are collected and the results are shown in the table.

	n	$\bar{x}$	s_x
Middle school	40	4.9 hours	1.6 hours
High school	40	6.1 hours	1.8 hours

Which of the following inference procedures is most appropriate?

A) Two-sample t -test for $\mu_1 - \mu_2$

B) Two-sample t -interval for $\mu_1 - \mu_2$

C) Paired t -test for μ_{diff}

D) Paired t -interval for μ_{diff}