

Graded Homework Set # 4 – Statistics Math 135

A large housing complex, with 1000 residents requires a vote to be taken to make a policy change for the tenants. A random sample of 34 residents was taken and 23 said that they were in favor of the change.

1. a. Find a point estimate of the true proportion of residents who favor the change.
b. What is the value of the sample standard deviation?
(See page 478 and 479)
2. Construct a 95% Confidence Interval for the true proportion of residents favoring the change. (See page 479)
3. If the confidence level were increased to 98%, would the interval expand or contract? Please explain why this is true.
4. The Gallop Poll found that 15% of adults surveyed nationwide said they had personally been in a tornado. How many adults should be surveyed to estimate the true proportion of adults who have been in a tornado with 90% confidence and a margin of error of 2%? (See page 482)
5. A researcher wishes to estimate the average amount of money a person spends on lottery tickets each month. Assuming that we have a normal probability distribution, a sample of 49 persons who play the lottery found the sample mean to be \$21 and the population standard deviation is known to be \$9. (See Example 2, page 450)
 - a. Find the best point estimate of the population mean.
 - b. For a 90% confidence interval for the amount of money a person spends on lottery tickets, what is the value of the error of the estimate, sometimes called the margin of error? (See page 455)
 - c. What is the confidence interval for the mean value of the amount of money spent on lottery tickets?
6. Using the information in problems #5 above, how large of a sample would be needed to estimate the mean amount of money spent on lottery tickets to within one dollar with 90% confidence? (See page 457)
7. What is the critical value of $z_{\frac{\alpha}{2}}$ that corresponds to a degree of confidence of 92%? (See pages 450, figure 1)

8. A researcher wishes to test the claim that the average age of lifeguards in Ocean City is greater than 22 years. The researcher selects a sample of 36 guards and finds the mean of the sample is 23.7 years. It is known that the standard deviation is 2 years. Let $\alpha = 0.10$. (page 517)

- a. List your H_0 and H_1 .
- b. What is your critical value of z ?
- c. What is your test value of the statistic, called z_{test} or z_0 ?
- d. Do we reject or accept the claim?
- e. Why or why not?
- f. What is the p-value for this testing procedure? (Page 521)

9. Identify which is the correct null hypothesis H_0 and the alternative H_1 for the following hypotheses testing problem: (Page 517)

A cereal company claims that the mean weight of the cereal in its packets is at least 14 ounces.

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| A.) $H_0 : \mu = 14$
$H_1 : \mu > 14$ | B.) $H_0 : \mu = 14$
$H_1 : \mu < 14$ | C.) $H_0 : \mu > 14$
$H_1 : \mu \leq 14$ | D.) $H_0 : \mu < 14$
$H_1 : \mu > 14$ |
|--|--|---|--|

10. A researcher claims that the average cost of women's athletic shoes is less than \$80. He selects a random sample of 49 pairs of shoes from a catalog and finds the sample mean is \$75 with a sample standard deviation of \$19.2. Is there enough evidence to support the researcher's claim at $\alpha = 0.10$? Ensure that all questions posed in the Testing Hypotheses instructions are answered. (See page 532)