

## Statistics

Review questions for Test-3

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**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

**Find and Interpret the margin of error for the given confidence interval.**

- 1) A survey found that 89% of a random sample of 1024 American adults approved of cloning endangered animals. Find the margin of error for this survey if we want 90% confidence in our estimate of the percent of American adults who approve of cloning endangered animals.

**Provide an appropriate response.**

- 2) A mayoral election race is tightly contested. In a random sample of 1000 likely voters, 520 said that they were planning to vote for the current mayor. Based on this sample, would you claim that the mayor will win a majority of the votes? Explain.

**Write the null and alternative hypotheses you would use to test the following situation.**

- 3) 3% of trucks of a certain model have needed new engines after being driven between 0 and 100 miles. The manufacturer hopes that the redesign of one of the engine's components has solved this problem.

**Provide an appropriate response.**

- 4) The seller of a loaded die claims that it will favor the outcome 5. We don't believe that claim, and roll the die 300 times to test an appropriate hypothesis. Our P-value turns out to be 0.02. Provide an appropriate conclusion.
- 5) A newspaper is considering the launch of an online edition. The newspaper plans to go ahead only if it's convinced that at least 40% of current readers would subscribe. The newspaper contacts a simple random sample of 1500 current subscribers, and 610 of those surveyed expressed interest. What should the company do? Test an appropriate hypothesis and state your conclusion. Be sure the appropriate assumptions and conditions are satisfied before you proceed.

**Create and interpret 95% confidence interval for the given data.**

- 6) Data in 1980 showed that about 50% of the adult population had never smoked cigarettes. In 2004, a national health survey interviewed a random sample of 6000 adults and found that 55% had never been smokers. Create a 95% confidence interval for the proportion of adults (in 2004) who had never been smokers.

**Provide the appropriate response.**

- 7) A Math professor has observed over several years that about 38% of the students who initially major in Math drop out of the program after their freshman year. The department head suggested making the curriculum easier by taking a couple of 300 level courses out of the requirements. With the new curriculum intact, 207 began their freshman year as Math majors and only 59 dropped out of the program. Should the college continue with the easier curriculum? Support your recommendation with an appropriate test. Explain carefully what your P-value means in this context.

A statistics professor asked her students whether or not they were registered to vote. In a sample of 50 of her students (randomly sampled from her 700 students), 35 said they were registered to vote.

- 8) Find a 95% confidence interval for the true proportion of the professor's students who were registered to vote. (Make sure to check any necessary conditions and to state a conclusion in the context of the problem.)
- 9) Explain what 95% confidence means in this context.

- 10) According to a September 2004 Gallup poll, about 73% of 18- to 29-year-olds said that they were registered to vote. Does the 73% figure from Gallup seem reasonable for the professor's class? Explain.
- 11) If the professor only knew the information from the September 2004 Gallup poll and wanted to estimate the percentage of her students who were registered to vote to within  $\pm 4\%$  with 95% confidence, how many students should she sample?