Statistics MCQs – Hypothesis Testing for One Population Part 9

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161. A random sample of 319 front-seat occupants involved in head-on collisions in a certain region resulted in 75 who sustained no injuries. We wish to use this sample data to test whether the true proportion of uninjured occupants in head-on collisions exceeds 0.25 or not. What would your conclusion be for this test of hypothesis, given a 5 % significance level?

a. I would conclude that the true proportion of uninjured occupants in head-on collisions has increased

b. I would conclude that the true proportion of uninjured occupants in head-on collisions has decreased

c. I would conclude that the true proportion of uninjured occupants in head-on collisions has remained at 0.25

d. I would conclude that the there is too little information to make a correct decision

e. I would conclude that the sample size in this case is too small and therefore the results of the test cannot be trusted

Answer: C

162. Dentists believe that 53 % of the general population suffers from tooth decay. The makers of Toothy Grin Toothpaste believe that using their product reduces tooth decay, and in order to support their claim study a random sample of 2000 Toothy Grin users. It turns out that 1005 of these are suffering from tooth decay. The evidence is investigated to see whether these figures present enough evidence to indicate a decrease in tooth decay for the Toothy Grin users. What would the appropriate conclusion be for this test (assuming a 5 % level of significance) ?

a. Toothy Grin Toothpaste is not effective in reducing tooth decay

b. Toothy Grin users suffer more tooth decay than the general population

c. Toothy Grin users suffer less tooth decay than the general population

d. the test is inconclusive as not enough information is present

e. none of the above conclusion is correct

Answer: C

163. Dentists believe that 53 % of the general population suffers from tooth decay. The makers of Toothy Grin Toothpaste believe that using their product reduces tooth decay, and in order to support their claim study a random sample of 2000 Toothy Grin users. It turns out that 1020 of these are suffering from tooth decay. The evidence is investigated to see whether these figures present enough evidence to indicate a decrease in tooth decay for the Toothy Grin users. What would the appropriate conclusion be for this test (assuming a 5 % level of significance) ?

a. Toothy Grin Toothpaste is not effective in reducing tooth decay

b. Toothy Grin users suffer more tooth decay than the general population

c. Toothy Grin users suffer less tooth decay than the general population

d. the test is inconclusive as not enough information is present

e. none of the above conclusion is correct

Answer: C

164. Dentists believe that 53 % of the general population suffers from tooth decay. The makers of Toothy Grin Toothpaste believe that using their product reduces tooth decay, and in order to support their claim study a random sample of 2000 Toothy Grin users. It turns out that 1100 of these are suffering from tooth decay. The evidence is investigated to see whether these figures present enough evidence to indicate a decrease in tooth decay for the Toothy Grin users. What would the appropriate conclusion be for this test (assuming a 5 % level of significance) ?

a. Toothy Grin Toothpaste is not effective in reducing tooth decay

b. Toothy Grin users suffer more tooth decay than the general population

c. Toothy Grin users suffer less tooth decay than the general population

d. the test is inconclusive as not enough information is present

e. none of the above conclusion is correct

Answer: A

165. Dentists believe that 53 % of the general population suffers from tooth decay. The makers of Toothy Grin Toothpaste believe that using their product reduces tooth decay, and in order to support their claim study a random sample of 2000 Toothy Grin users. It turns out that 1050 of these are suffering from tooth decay. The evidence is investigated to see whether these figures present enough evidence to indicate a decrease

in tooth decay for the Toothy Grin users. What would the appropriate conclusion be for this test (assuming a 5 % level of significance) ?

a. Toothy Grin Toothpaste is not effective in reducing tooth decay

b. Toothy Grin users suffer more tooth decay than the general population

c. Toothy Grin users suffer less tooth decay than the general population

d. the test is inconclusive as not enough information is present

e. none of the above conclusion is correct

Answer: A

166. Dentists believe that 53 % of the general population suffers from tooth decay. The makers of Toothy Grin Toothpaste believe that using their product reduces tooth decay, and in order to support their claim study a random sample of 2000 Toothy Grin users. It turns out that 1085 of these are suffering from tooth decay. The evidence is investigated to see whether these figures present enough evidence to indicate a decrease in tooth decay for the Toothy Grin users. What would the appropriate conclusion be for this test (assuming a 5 % level of significance) ?

a. Toothy Grin Toothpaste is not effective in reducing tooth decay

b. Toothy Grin users suffer more tooth decay than the general population

c. Toothy Grin users suffer less tooth decay than the general population

d. the test is inconclusive as not enough information is present

e. none of the above conclusion is correct

Answer: A

167. It is suspected that, in lower class suburbs, residents replace their cars less often than the national average. We know that nationally, the proportion of new cars is 27.1 % . A researcher investigates through proper sampling and finds that 37 out of 155 cars belonging to residents in a lower class suburb were new. We wish to test whether the proportion of new cars in this lower class suburb is less than the national average. What is the p-value for the hypothesis test indicated above?

a. 0.9055

b. 0.1479

c. 0.3149

d. 0.5497

e. 0.1814

Answer: E

168. A major videocassette rental chain is considering opening a new store in an area that currently does not have any such stores. The chain will open if there is evidence that more than 25 % of households in the area are equipped with videocassette recorders (VCR's) . It conducts a telephone poll of 300 randomly selected households in the area and finds that 96 have VCR's. A hypothesis test is conducted to establish whether the proportion of households in the area equipped with VCR's is more than 25 % . What is the p-value for this hypothesis test?

a. 0.0164

b. 0.4796

c. 0.0026

d. 0.1347

e. 0.9874

Answer: C

169. A random sample of 200 observations exhibits 36 successes. We wish to test at the 1 % significance level whether the true proportion of successes in the population is less than 24 % . What is the p-value for this hypothesis test?

a. 0.023

b. 0.046

c. 0.977

d. 0.500

e. 0.751

Answer: A

170. Scientists think that robots will play a crucial role in factories in the next 20 years. Suppose that in an experiment to determine whether the use of robots to weave computer cables is feasible, a robot was used to assemble 500 cables. The cables were examined and there were 14 defectives. Human assemblers have a defect rate of 3 % (0.03) . We wish to test whether the proportion of defectives produced by robots is less than that of humans, at the 5 % significance level. What is the correct conclusion for this hypothesis test?

a. there is statistical evidence to reject the null hypothesis and conclude that robots do produce fewer defectives than humans

b. there is statistical evidence to not reject the null hypothesis and conclude that robots do produce fewer defectives than humans

c. there is statistical evidence to not reject the null hypothesis and conclude that robots do not produce fewer defectives than humans

d. there is statistical evidence to reject the null hypothesis and conclude that robots do not produce fewer defectives than humans

e. no conclusion can be made as not enough information is given

Answer: C

171. Using the confidence interval when conducting a two-tail hypothesis test for the population mean, we do not reject the null hypothesis is the hypothesised value for the population mean:

a. is to the left of the lower confidence limit

b. is to the right of the upper confidence limit

c. falls between the lower and upper confidence limits

d. falls outside of the range of the confidence interval

e. falls into the rejection region

Answer: C

172. Based on sample data, the 90 % confidence interval for the population mean is (127.5,154.3) . If the 10 % significance level was used in testing the alternate hypothesis that the true population mean is not equal to 163, the null hypothesis would:

a. be rejected

b. not be rejected

c. have to be revised

d. need to be tested in a subsequent test

e. none of the above

Answer: A

173. Based on sample data, the 90 % confidence interval for the population mean is (127.5,154.3) . If the 10 % significance level was used in testing the alternate hypothesis that the true population mean is not equal to 153, the null hypothesis would:

a. be rejected

b. not be rejected

c. have to be revised

d. need to be tested in a subsequent test

e. none of the above

<div align="right">Answer: B</div>

174. Suppose that a random sample of 50 bottles of a particular brand of cough medicine is selected and the alcohol content of each bottle measured. The sample mean alcohol content is 8.6 ml with a population standard deviation of 2.88ml. A 99 % confidence interval for the true mean alcohol content for the population of all bottles of the brand under study was calculated as being (7.55,9.65) . If we were interested in testing the null hypothesis that the population mean is equal to 8.5, using the 99 % confidence interval calculated above, our conclusion would be:

a. Reject the null hypothesis since the 99 % confidence interval does contain the point 8.5

b. Reject the null hypothesis since the 99 % confidence interval does not contain the point 8.5

c. Do not reject the null hypothesis since the 99 % confidence interval does contain the point 8.5

d. Do not reject the null hypothesis since the 99 % confidence interval does not contain the point 8.5

e. None of the above

<div align="right">Answer: C</div>

175. A confidence interval was used to estimate the proportion of statistics students that are females. A random sample of 72 statistics students generated the following 90 % confidence interval: (0.438; 0.642) . Based on the interval above, is the population proportion of females equal to 0.60?

a. No, and we are 90 % sure that the population proportion of females is not equal to 0.60

b. No. The proportion is 54.17 %

c. Maybe. 0.60 is a believable value for the population proportion based on the given information

d. Yes, and we are 90 % sure that the population proportion of females is equal to 0.60

e. None of the above

<div align="right">Answer: C</div>