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Significance tests

Quiz, 10 questions

Question 1

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point

**1. Question 1**

Which of the following statement(s) is/are correct?

I. If you conduct a significance test you assume that the alternative hypothesis is true unless the data provide strong evidence against it.

II. The null hypothesis and the alternative hypothesis are always mutally exclusive.



Statement II is correct, statement I is incorrect.



Both statements are correct.



Both statements are incorrect.



Statement I is correct, statement II is incorrect.

Question 2

1  
point

**2. Question 2**

You are interested in the question how long Dutch scuba-divers can stay underwater. You heard that the average number of minutes Dutch scuba-divers can dive without coming to the surface equals 68 minutes. You don't believe that's true and decide to conduct a test. Your null hypothesis is that the population mean equals 68. Your alternative hypothesis is that the population mean differs from 68. You question 40 randomly selected Dutch scuba-divers and discover that they can stay underwater for only 64 minutes. The standard deviation is 3 minutes. Do you reject your null hypothesis?



Yes, because the test statistic falls in the rejection region.



Yes, because the test statistic is higher than the signficance level.



No, because the test statistic is not higher than the significance level.



No, because the test statistic doesn't fall in the rejection region.

Question 3

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**3. Question 3**

Last year the mean turnover of a group of companies was 430,000 euro. You expect that this year’s turnover will be different. Your null hypothesis is therefore: μ = 430,000. Your alternative hypothesis is: μ ≠ 430,000. You randomly sample 81 companies. The sample mean turns out to be 450,000 euro, with a standard deviation of 100,000 euro. Calculate the test statistic. Which of the following statements is correct?



You reject the null hypothesis **both**when using a significance level of 0.10 and a significance level of 0.05.



You reject the null hypothesis using a significance level of 0.05, you **don't**reject the null hypothesis using a significance level of 0.10.



You **don't** reject the null hypothesis neither when using a significance level of 0.10 nor when using a significance level of 0.05..



You reject the null hypothesis using a significance level of 0.10, you **don't** reject the null hypothesis using a significance level of 0.05.

Question 4

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point

**4. Question 4**

A researcher decides to investigate the effect of having a newborn baby on parents' ability to focus. She decides to do a one-sided test because earlier studies found a negative effect. She formulates both the null and the alternative hypothesis and then decides to use a significance level of 0.05. Next, she starts to gather data and to compute the relevant statistics.

What did the researcher forget to do?



She should have checked the assumptions.



She should have gathered data first.



She should have used a significance level of 0.01.



She shouldn't have formulated the alternative hypothesis.

Question 5

1  
point

**5. Question 5**

The 95% confidence interval of variable X equals (15.15, 17.09). The sample consists of 302 respondents. The null hypothesis is that the population mean equals 16. The alternative hypothesis is that the population mean is different from 16.

What can you conclude with α = 0.05?



You don't have enough information to conclude anything.



The confidence interval must be wrong.



You reject the nulhypothesis: the population mean is not 16.



You **don't**reject the null hypothesis.

Question 6

1  
point

**6. Question 6**

Bob wants to know more about the influence of smoking on driving. He draws a sample of respondents, assesses their smoking habits and puts them in a driving simulator. After having collected the data, he decides to conduct a one-sided test. Which consideration(s) will have been the reason for this decision?



He doesn't know what to expect about the influence of smoking on driving.



He has a clear expectation about the influence of smoking on driving.



He wants to make sure he doesn't miss any information about the influence of smoking on driving.

Question 7

1  
point

**7. Question 7**

You want to know more about the time scuba divers practice their diving skills. Before you take a sample you formulate the null hypothesis and the alternative hypothesis as follows:

H0: μ = 400 minutes

Ha: μ ≠ 400 minutes

Based on a simple random sample of 100 scuba divers you find a mean of 380. Based on a significance test with α = 0.01 you don't reject the null hypothesis.

What could have happened?



You could have made a type I error.



You could have made a type II error.



You could have made a type III error.



All of the other options are possible.

Question 8

1  
point

**8. Question 8**

A professor wants to know what people prefer: going to the beach or going to the swimming pool. Last year 86% preferred going to the beach. The professor expects this year to be different. She asks 900 people about their opinion and finds that 84% still prefers the beach. What do you conclude based on a significance level of 0.05?



You **accept**the null hypothesis.



You **reject**the null hypothesis.



You **don't**reject the null hypothesis.



You don't have enough information to conclude anything.

Question 9

1  
point

**9. Question 9**

A professor wants to know how many adults in America have a driving license. He reads an article saying that 78% of Americans possess a driving license, but he's not so sure of that. The professor has good theoretical reasons to think it should be more than 78%. What are the professor's null hypothesis and his alternative hypothesis? (Select two answers.)



H0: The (population) proportion of American adults that possess a driving license equals 0.78.



Ha: The (population) proportion of American adults that possess a driving license is higher than 0.78.



H0: The (population) proportion of American adults that possess a driving license equals zero.



Ha: The (population) proportion of American adults that possess a driving license does not equal 0.78.

Question 10

1  
point

**10. Question 10**

Why would a researcher choose a small significance level (say 0.01 instead of the usual 0.05)? (Multiple answers possible.)



To decrease the probability of making a type I error.



To decrease the probability of making a type II error.



To decrease the probability of rejecting the null hypothesis when the null hypothesis is true.



To increase the probability that he rejects the null hypothesis when the evidence is in favor of the alternative hypothesis.

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