Final Exam

30 questions

1.

What does the test statistic tell you?

- It indicates how many standard errors a point estimate lies from the expected null hypothesis population value.
- It's another word for the p-value.
- It indicates whether you should use z- or t-distribution to calculate probability.
- It indicates how far from the actual population value your sample mean lies.

2.

In a group of students 25% are enrolled in physics, 23% in sociology, 17% in chemistry, 14% in political science, 12% in anthropology, and 9% in math. You are going to select an individual from the group of students. The probability of event A is equivalent to the probability that you select someone who studies social science (sociology, political science and anthropology) or physics. What is the probability of the event A's complement?

- 0.51
- 0.26
- 0.49
- 0.74

3.

Assume your null hypothesis is μ = 6. In your sample you find a value that is lower than 6. Is it 'easier' to reject the null hypothesis with a one-tailed or two-tailed test?

- A one-tailed test.
- A two-tailed test.
- This depends on the level of significance.
- This depends on the P value.

4.

Someone makes the following assertion: if the sample becomes larger, then the standard deviation becomes smaller. Which of the following statements is correct?

- This assertion does not apply to any distribution.
- This assertion always applies to all distributions.
- This assertion always applies to the sample distribution and the sampling distribution.
- This assertion always applies to the sampling distribution.

5.

The largest number of Oscars received by a film in year X was 4. This was different in previous years. Below is a probability distribution for the number of Oscars per Oscar winning film. What is the standard deviation of this distribution?

Number of Oscars	P(x)
1	0.56
2	0.23
3	0.11

4	0.05
5	0.03
6	0.02

- 1.82
- 1.19
- 6
- 1.32

6.

You draw a sample from the population of a town (n = 312) and find that of this sample, 23% are highly educated and 27% are low-educated. What is the 80% confidence interval for the proportion of highly educated people in this town?

- (0.21, 0.25)
- (0.20, 0.26)
- (0.25, 0.29)
- (0.23, 0.27)

7.

What type of table is shown below?

Country	GDP	Gini Index
The Netherlands	850,000	25
Germany	3,500,000	30
France	2,800,000	31

Italy	2,000,000	33

- Data matrix
- Cross table
- Frequency table
- Scatterplot

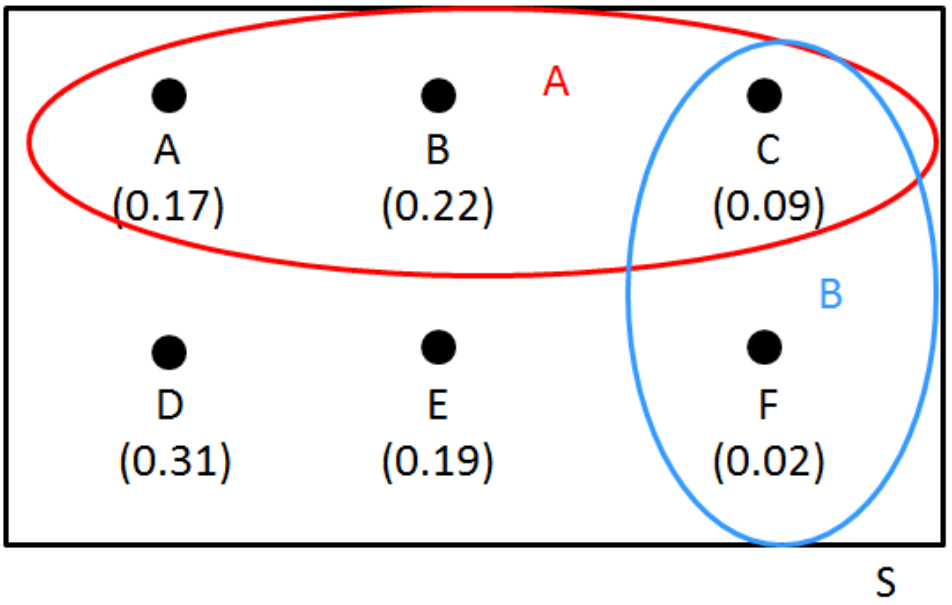
8.

You know that there is a strong correlation between the consumption of ice cream and body weight. The Pearson's r = 0.78. You also know that the average consumption of ice cream per week is five grams with a standard deviation of 1.5 grams. The average weight is 65 kg with a standard deviation of 15 kg. What is the formula of the regression line?

- $\hat{y} = -502 + 0.078x$
- $\hat{y} = 26 + 7.8x$
- $\hat{y} = 0.078 - 502x$
- $\hat{y} = 7.8 + 26x$

9.

See the sample space below. What is the probability of event B occurring, given that event A has occurred?



- 0.09
- 0.23
- 0.82
- 0.19

10.

What is a probability?

- An uncertainty.
- A P-value.
- The proportion of times that something will occur in the long run.
- The number of times that something occurs in an experiment.

11.

25% of all students find this BS exam difficult. You select four random students. What is the probability that exactly two of them find this exam difficult?

- 0.06
- 0.07
- 0.21
- 0.02

12.

Various forms of bias can occur when we select a sample. What is sampling bias?

- If not everyone in the sample actually participates in the research.
- If not everyone in the sample belongs to the population.
- If not everyone in the population has an equal chance to enter the sampling frame.
- If not everyone in the sampling frame has an equal chance to get into the sample.

13.

Variable A is normally distributed with $\mu = 12.30$ and $\sigma = 3.11$. What is the probability that a randomly selected case will have a score of less than 14?

- 0.88
- 0.29
- 0.71

- 0.12

14.

A random sample of 61 Basic Statistics students were asked what they thought of statistics on a scale of 0 (very stupid) to 100 (very nice). Interestingly, students seem to find statistics quite nice: the sample mean equals 83. The sample standard deviation equals 7. We know that the standard deviation in the population (all BS students) is 8. Calculate the 90% confidence interval.

- (81.53, 84.47)
- (81.24, 84.76)
- (81.32, 84.68)
- (80.99, 85.01)

15.

You know that for variable A $\mu = 1400$ and $\sigma = 300$. You also know that the variable is normally distributed. You decide to change the scores of this variable into z-scores. What is the mean and standard deviation of this new distribution?

- Cannot be calculated on the basis of this information.
- Mean = 1400, standard deviation = 1.
- Mean = 1400, standard deviation = 300.
- Mean = 0, standard deviation = 1.

16.

Ten students resit the Basic Statistics exam. Their final grades are: 4, 4, 2, 9, 7, 9, 6, 4, 7, 8. What is the interquartile range?

- 2
- 8
- 4
- 7

17.

Which of the following is not the explained variance?

- The degree to which the regression equation of X and Y is better at predicting the dependent variable than the average of Y.
- The percentage of variance in Y that is explained by the mean of X.
- The percentage of the variance in Y which is explained with the regression equation.
- The Pearson r squared.

18.

Look at the following cross table of two ordinal variables. Is there a correlation between variable A and B?

	Variable A				
Variable B	1	2	3	4	Total
1	5	5	5	5	20
2	5	5	5	5	20
3	5	5	5	5	20
4	5	5	5	5	20
Total	20	20	20	20	80

- No, there is no correlation.
- Yes, there is a negative correlation.
- Cannot be seen from the table.
- Yes, there is a positive correlation.

19.

Look at the table below. Calculate the Pearson's r.

	Variable 1	Variable 2
Person 1	1	23
Person 2	6	48
Person 3	7	41

- 0.61
- 0.91
- 0.71
- 0.81

20.

Based on a random sample of n = 2345, the 95% confidence interval of variable X is (7.25, 9.12). You expect that the mean in the population is different from 7 at $\alpha = 0.05$. What can you conclude?

- Nothing, because you have not enough data to determine that.
- The value in the population is indeed different from 7.

- You cannot reject the null hypothesis.
- This confidence interval is wrong.

21.

Which of the following statements about the regression line is not correct?

- The constant indicates the place where the regression line crosses the Y-axis.
- The regression line is the line of which the sum of the residuals is the smallest.
- The regression line can run horizontally.
- The regression coefficient is the change in the Y value with 1 unit increase in the X value.

22.

You're going to draw a random sample of professional football players because you want to know what percentage have completed high school. You want to have a margin of error of up to 0.03 at a confidence level of 90%. How big should your sample be?

- At least 30
- Minimum 456
- Minimum 1068
- Minimum 748

23.

81 random elementary schools were asked for their average exam scores (sample mean = 535, sample standard deviation = 7). Calculate the 98% confidence interval.

- (528.00, 542.00)

- (533.15, 536.85)
- (533.41, 536.59)
- Not possible to calculate based on this information.

24.

A type I error means that:

- The null hypothesis is true, and you do not reject the null hypothesis.
- The null hypothesis is true, and you reject the null hypothesis.
- The null hypothesis is false, and you reject the null hypothesis.
- The null hypothesis is false and cannot reject the null hypothesis.

25.

You know that the heights of four people are: 156 cm, 184 cm, 172 cm and 165 cm. What is the standard deviation?

- 28
- 10.23
- 139.58
- 11.81

26.

Last year the mean turnover of a group of companies was 434,000 euro. You have good reasons to expect that this year's turnover will be higher. Your null hypothesis is therefore: $\mu = 434{,}000$. Your alternative hypothesis is: $\mu > 430{,}000$.

You randomly sample 101 companies from the population. 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 do not reject the null hypothesis at $\alpha = 0.05$, and not at $\alpha = 0.10$.
- You reject the null hypothesis at both $\alpha = 0.05$ and $\alpha = 0.10$.
- You reject the null hypothesis at $\alpha = 0.05$, but not at $\alpha = 0.10$.
- You reject the null hypothesis at $\alpha = 0.10$, but not at $\alpha = 0.05$.

27.

Film critics gave the film Basic Statistics: The Movie an average rating of 8.1 (on a scale of 0-10). The standard deviation is 0.7. You drew a random sample of n = 56 from all film critics and asked them to rate the film Basic Statistics: The Movie with a number. What is the probability that the average rating in the sample is greater than 8.0?

- 14%
- 44%
- 86%
- 56%

28.

You draw a sample from the population of Dutch voters. You do this by randomly selecting 10 voters from each municipality. What kind of sample is this?

- Snowball
- Cluster random

- Stratified random
- Convenience

29.

What does the 95% confidence interval tell us?

- In 95% of cases when we sample from a population, the sample mean falls within the interval:

  sample mean ± 1.96 * standard deviation of the sampling distribution.

- In 95% of cases when we sample from a population, the population mean falls within the interval:

  sample mean ± 1.96 * standard deviation of the sampling distribution.

- In 95% of cases when we sample from a population, the sample mean falls within the interval:

  sample mean ± 1.64 * standard deviation of the sampling distribution.

- In 95% of cases when we sample from a population, the population mean falls within the interval:

  sample mean ± 1.64 * standard deviation of the sampling distribution.

30.

What is a characteristic of the t-distribution?

- The t-distribution approaches the normal distribution if it has a large standard deviation.
- The t distribution has a mean of one.
- The t-distribution has the same shape as the normal distribution.

- A t-value that is multiplied with a standard error is equal to the margin of error for a confidence interval of a mean.

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