



Course: Business Statistics (20116)
Term: Summer term 2013
Examiner: PD Dr. Annette Kirstein
Date: 30.07.2013

Final Examination

First name:

Last name:

Matriculation number: _____
(up to 9 digits)

Available time: 60 minutes

Maximum points: 60 points

Permitted aid(s):

- Non-programmable pocket calculator *without data storage and communication capabilities*
- Formula Sheet, individually printed at home and brought to the final exam (4 pages formulas + 5 pages distribution tables), **no further notes (handwritten or printed) allowed on the Formula Sheet!**

General information:

1. There are 20 questions all together. In all questions *one out of four* answers is correct.
2. In each question points are given as follows:
If you mark only correct: points cf.problem
If you mark only wrong: 0 points
If you mark correct and wrong / nothing: 0 points
3. Feel free to use the empty space on the present exam for your personal calculations or notes. But note that *whatever you write on these pages will be ignored during correction! Only the answer sheet will be evaluated.*
4. Points given for correct solutions correspond to the processing time assigned (in minutes).
5. **Return all the paper you received or used (without exception).**

GOOD LUCK!

1. **Data and Statistics. (2 points)** In a questionnaire, respondents are asked to mark their gender as male or female. Gender is an example of a
 - a. qualitative variable
 - b. quantitative variable
 - c. qualitative or quantitative variable, depending on the respondents' answers
 - d. None of these alternatives is correct.

2. **Data and Statistics. (2 points)** Data collected over several time periods are
 - a. time series data
 - b. time controlled data
 - c. crosssectional data
 - d. time crosssectional data

3. **Descriptive Statistics. (2 points)** The relative frequency of a class is computed by
 - a. dividing the cumulative frequency of the class by n
 - b. dividing n by the cumulative frequency of the class
 - c. dividing the frequency of the class by n
 - d. dividing the frequency of the class by the number of classes

4. **Descriptive Statistics. (2 points)** In a scatter diagram, a line that provides an approximation of the relationship between the variables is known as
 - a. approximation line
 - b. trend line
 - c. line of zero intercept
 - d. line of zero slope

5. **Probabilities. (2 points)** Bayes' theorem is used to compute
 - a. the prior probabilities
 - b. the union of events
 - c. intersection of events
 - d. the posterior probabilities

6. **Probabilities. (4 points)** If A and B are independent events with $P(A) = 0.4$ and $P(B) = 0.6$, then $P(A \cap B) =$
 - a. 0.76
 - b. 1.00
 - c. 0.24
 - d. 0.20

7. **Probabilities. (4 points)** Events A and B are mutually exclusive. Which of the following statements is also true?
 - a. A and B are also independent.
 - b. $P(A \cup B) = P(A)P(B)$
 - c. $P(A \cup B) = P(A) + P(B)$
 - d. $P(A \cap B) = P(A) + P(B)$

8. **Probability distributions. (2 points)** Which of the following is **not** a characteristic of an experiment where the binomial probability distribution is applicable?
- the experiment has a sequence of n identical trials
 - exactly two outcomes are possible on each trial
 - the trials are dependent
 - the probabilities of the outcomes do not change from one trial to another
9. **Exponential probability distribution. (4 points)** $f(x) = (1/10) e^{-x/10} \quad x \geq 0$
The probability that x is between 3 and 6 is
- 0.4512
 - 0.1920
 - 0.2592
 - 0.6065
10. **Continuous uniform distribution. (4 points)** The assembly time for a product is uniformly distributed between 6 to 10 minutes. The probability of assembling the product between 7 to 9 minutes is
- zero
 - 0.50
 - 0.20
 - 1
11. **Sampling. (2 points)** In point estimation
- data from the population is used to estimate the population parameter
 - data from the sample is used to estimate the population parameter
 - data from the sample is used to estimate the sample statistic
 - the mean of the population equals the mean of the sample
12. **Sampling. (4 points)** A population has a mean of 80 and a standard deviation of 7. A sample of 49 observations will be taken. The probability that the sample mean will be larger than 82 is
- 0.5228
 - 0.9772
 - 0.4772
 - 0.0228
13. **Interval Estimation. (4 points)** A random sample of 121 automobiles traveling on an interstate showed an average speed of 65 mph. From past information, it is known that the standard deviation of the population is 22 mph. The 96.6% confidence interval for μ is 60.76 to 69.24. If the sample size was 100 (other factors remain unchanged), the interval for μ would
- not change
 - become narrower
 - become wider
 - become zero
14. **Hypothesis tests. (2 points)** If a hypothesis test leads to the rejection of the null hypothesis
- a Type II error must have been committed
 - a Type II error may have been committed
 - a Type I error must have been committed
 - a Type I error may have been committed

15. **Hypothesis test on means of two populations. (4 points)** A statistics teacher wants to see if there is any difference in the abilities of students enrolled in statistics today and those enrolled five years ago. A sample of final examination scores from students enrolled today and from students enrolled five years ago was taken. You are given the following information.

	Today	Five Years Ago
\bar{x}	82	88
σ^2	112.5	54
n	45	36

- What is the conclusion that can be reached about the difference in the average final examination scores between the two classes? (Use a .05 level of significance.)
- There is a statistically significant difference in the average final examination scores between the two classes.
 - There is no statistically significant difference in the average final examination scores between the two classes.
 - It is impossible to make a decision on the basis of the information given.
 - There is a difference, but it is not significant.
16. **Inferences about the variances of two populations. (4 points)** We are interested in determining whether or not the variances of the sales at two music stores (A and B) are equal. A sample of 26 days of sales at store A has a sample standard deviation of 30 while a sample of 16 days of sales from store B has a sample standard deviation of 20. The test statistic is
- 1.50
 - 0.67
 - 1.56
 - 2.25
17. **ANOVA. (4 points)** In an analysis of variance problem involving 3 treatments and 10 observations per treatment, $SSE = 399.6$. The MSE for this situation is
- 133.2
 - 13.32
 - 14.8
 - 30.0
18. **ANOVA. (2 points)** In the analysis of variance procedure (ANOVA), “*factor*” refers to
- the dependent variable
 - the independent variable
 - different levels of a treatment
 - the critical value of F

19. **Simple linear regression. (4 points)** The following information regarding a dependent variable (Y) and an independent variable (X) is provided.

Y	X
4	2
3	1
4	4
6	3
8	5

SSE = 6
SST = 16

The least squares estimate of the Y intercept is

- a. 1
 - b. 2
 - c. 3
 - d. 4
20. **Non-parametric tests. (2 points)** A nonparametric test for the equivalence of two populations would be used instead of a parametric test for the equivalence of the population parameters if
- a. the samples are very large
 - b. the samples are not independent
 - c. no information about the populations is available
 - d. The parametric test is always used in this situation.