Tutorial letter 101/3/2019

Basic Statistics

STA1510

Semesters 1 & 2

Department of Statistics

IMPORTANT INFORMATION:

This tutorial letter contains important information about your module and includes the assignment questions for both semesters.

CONTENTS

Page

1 INTRODUCTION

Dear Student,

Welcome to this module. We trust your studies will be rewarding and successful!

This is the service module of the Department of Statistics and is prescribed for students from different disciplines and with different background knowledge. It aims to present statistics in an interesting and useful way without complicating the module using difficult mathematics. The basic techniques in statistics will be covered to familiarise students with statistical terms and basic knowledge so that they will be able to use statistical textbooks in their future careers if needed. This is a *stand-alone* module and is not a prerequisite for any other modules in statistics.

1.1 Tutorial matter

The tutorial matter that UNISA provides to you for this module consists of the following:

- **Tutorial letter 101** (this tutorial letter). Read this letter now to the end, and save it as it contain important information *as well as your assignments for the semester.*
- **A study guide** written by a lecturer to guide you through the relevant sections in the prescribed textbook. Use it together with the textbook, as the guide indicates the relevant prescribed sections, explaining difficult concepts in more detail, giving additional examples and exercises, etc.
- Other tutorial letters to further assist you with your studies, will be dispatched to you throughout the year.

Note that you will need to buy a prescribed textbook. See section 4 of this letter for details on the textbook.

The Department of Despatch should have supplied to you the tutorial letter 101 and the study guide shortly after your registration. The other tutorial letters will be sent to you throughout the semester. Follow the instructions in the brochure entitled *my Studies @ Unisa* if you do not receive some of the material that should have been sent to you.

Take note that every tutorial letter you will receive is important and you have to read them all immediately and carefully. Some information contained in these tutorial letters may be urgent, while others may, for example, contain examination information. So, it is wise to keep them all in a file!

If you have access to the Internet, you can view and print the study guide and tutorial letters for the modules for which you are registered on the University's online campus, myUnisa, at http://my.unisa.ac.za
As UNISA is moving increasingly towards online access to study material, please note that some tutorial letters may only be available for downloading on the module's myUnisa web site. We will attempt to send you all the material in printed copy, however this might only be later in the semester. All the study material is immediately availabe on myUnisa, often long before it reaches you via mail or courier. It is important that you activate your myLife email account, since a notification is sent to your myLife email address whenever a new resource is made availabe. Alternatively, you should regularly visit the module web site so check on any new available material.

2 PURPOSE OF AND OUTCOMES FOR THE MODULE

2.1 Purpose

Students credited with this unit standard will be familiar with the most important basic statistical concepts. After completion students should have an informed understanding of different visual descriptions of data, including graphical and tabular techniques; and measures of central location, dispersion and association. They should be able to use probability as a tool to create discrete and continuous probability distributions, used extensively in statistical inference; determine confidence intervals and perform hypothesis testing involving a sample mean and proportion; apply different forms of Chi-square testing; understand simple linear regression and correlation.

2.2 Outcomes

Qualifying students will be able to:

- Analyse data considering different types of data and how they relate to relevant graphical and tabular presentations e. g. pie charts, bar charts, histograms, stem-and-leaf displays, line charts and scatter diagrams.
- Analyse data by calculating accurate numerical measures of central location, variability, relative standing.
- Describe the different concepts and laws of probability and apply definitions of joint, marginal and conditional probability.
- Apply the complementary, multiplication and addition rules or probability.
- Understand the role of probability in decision making and the application in basic statistical inference.
- Describe random variables and the probabilities associated with them in the form of a table, formula or graph and also in terms of their parameters, usually the expected value and the variance.
- Describe different probability distributions as either discrete or continuous and know the parameters of expected value and variance.
- Construct small-sample tests and confidence intervals for population means and proportions.

3 LECTURER AND CONTACT DETAILS

3.1 Lecturer

The lecturer responsible for this module is:

Mr TP Mohlala
Room: 6-18, Florida Science Campus
GJ Gerwel Building
Tel: 011 670 9254
Email: mohlatp@unisa.ac.za

You might also want to write to us. Letters should be sent to:

Mr. T.P. Mohlala
Department of Statistics
Florida Science Campus
PO Box 392
UNISA
0003

If you encounter difficulties, either with the assignment or with the contents of the textbook or the study guide, please feel free to contact me directly. If you cannot get hold of me, please phone the departmental secretary at (011) 670 9255. She will assist you with information about the availability of a lecturer or can put you through to other lecturers who will be able to help you.

All queries that are not of a purely administrative nature but are about the content of this module should be directed to me. Please have your study material with you when you contact me.

PLEASE NOTE: Letters to lecturers should not be enclosed with or inserted into assignments.

3.2 Department

The departmental secretary can be contacted at (011) 670 9255 for other queries.

3.3 University

If you need to contact the University about matters not related to the content of this module, please consult the publication *My Studies @ Unisa* that you received with your study material, and which is also available on the myUnisa web site.. This brochure contains information on how to contact the University (e.g. to whom you can write for different queries, important telephone and fax numbers, addresses and details of the times certain facilities are open).

Always have your student number at hand when you contact the University.

4 MODULE RELATED RESOURCES

4.1 Prescribed books

The prescribed book for this module is

David. M. Levine, K.A. Szabat and David F. Stephan.
BUSINESS STATISTICS: A First Course
(2016), 7th edition, Pearson, ISBN: 9781292096056

You have to buy this book. Please consult the list of official booksellers and their addresses listed in *my Studies @ Unisa*. Prescribed books can be obtained from the University's official booksellers. If you have difficulty locating your book(s) at these booksellers, please contact the Prescribed Books Section at 012 429 4152 or e-mail vospresc@unisa.ac.za.
For shorter reference, we use **Levine** in the rest of this tutorial letter when we need to refer the prescribed book.
Note that the edition of the book with the ISBN number as given above, and which is stocked by UNISA's official booksellers, is a special UNISA edition and comes bundled with the access code to a resource called MyStatLab. This is an internet based interactive course built around this textbook. See under Section 5.4 for more information on how MyStatLab can help you.

4.2 Recommended books

There are no recommended books for this module.

4.3 Electronic Reserves (e-Reserves)

There are no e-Reserves for this module.

4.4 Library services and resources information

The Unisa Library offers a range of information services and resources:

- for detailed Library information go to
  http://www.unisa.ac.za/sites/corporate/default/Library
- for research support and services (e.g. personal librarians and literature search services) go to
  http://www.unisa.ac.za/sites/corporate/default/Library/Library-services/Research-support

The Library has created numerous Library guides:
http://libguides.unisa.ac.za
Recommended guides:

- Request and download recommended material:
  http://libguides.unisa.ac.za/request/request
- Postgraduate information services:
  http://libguides.unisa.ac.za/request/postgrad
- Finding and using library resources and tools:
  http://libguides.unisa.ac.za/Research_skills
- Frequently asked questions about the Library:
  http://libguides.unisa.ac.za/ask
- Services to students living with disabilities:
  http://libguides.unisa.ac.za/disability

5 STUDENT SUPPORT SERVICES FOR THE MODULE

The Study @ Unisa brochure is available on myUnisa: www.unisa.ac.za/brochures/studies
This brochure has all the tips and information you need to succeed at distance learning and, specifically, at Unisa.

5.1 Tutors

To further assist you in mastering this module, you will be allocated an e-tutor. Communication with your e-tutor is via a special e-tutor website you will be linked to soon after registration. The tutor is there to support you throughout the semester as you work through the study material.
Certain Statistics modules will also have face-to-face tutors at selected regional centres. Please enquire at your local centre about this.

5.2 myUnisa

If you have access to a computer that is linked to the internet, you can quickly access resources and information at the University. The *myUnisa* learning management system is Unisa's online campus that will help you to communicate with your lecturers, with other students and with the administrative departments of Unisa - all through the computer and the internet. Please consult the publication *my Studies @ Unisa* which you received with your study material for more information on *myUnisa*.

To go to the *myUnisa* website, start at the main Unisa website, http://www.unisa.ac.za, and then click on the "Login to *myUnisa*" link on the right-hand side of the screen. This should take you to the *myUnisa* website. You can also go there directly by typing in http://my.unisa.ac.za. On the website you will find general Unisa related information, plus a module site for each module you are registered for.

We strongly recommend you to visit the myUnisa site of this module regularly through the semester, for the following reasons:

- You can click on course contact to send an email to the lecturer right away.
- You will find a discussion forum which helps you stay in touch with fellow students.
- Through the discussion forum and the Frequently Asked Questions (FAQ) section, you are likely to find answers to any specific queries you may have about the contents of the module.
- myUnisa gives you the fastest access to any tutorial letters of the module – you should go there if any tutorial matter you are expecting has been delayed in mail.

5.3 Discussion classes

Details on the dates, venues, etc. on discussion classes will be announced on a separate tutorial letters accordingly.

5.4 Free computer and internet access

Unisa has entered into partnerships with establishments (referred to as Telecentres) in various locations across South Africa to enable you (as a Unisa student) free access to computers and the Internet. This access enables you to conduct the following academic related activities: registration; online submission of assignments; engaging in e-tutoring activities and signature courses; etc. Please note that any other activity outside of these are for your own costing e.g. printing, photocopying, etc. For more information on the Telecentre nearest to you, please visit www.unisa.ac.za/telecentres.

5.5 MyStatLab

As discussed before, the prescribed textbook for this modules comes with an access code to an internet-based online course for the textbook, hosted by the publishers. If you have access to the internet, and have purchased a copy of the textbook with the access code, we strongly recommend that you make use of the MyStatLab resource.

What are the benefits of using MyStatLab?

As a Unisa student you are studying from home and probably have a demanding full time job that takes up a lot of your time. You are working on your own and do not have the luxury of immediate, personal communication with friends in the same course or the lecturers who teach you.

Here are some reasons why you should definitely start using MyStatLab today:

- 24 hour personal tutor: Pearson's MyStatLab is like having a 24 hour tutor at your disposal. MyStatLab will show you your personal strengths and weaknesses and develop a personalised study plan for you. The study plan allows you to practice the problems as much as you need to, until you have mastered the concept. This will help you to prepare better and therefore lead to better results on your assignments and exams!
- Instant feedback: MyStatLab will immediately give you specific feedback on a problem you are working on. This means you do not have to wait for your lecturer's office hours if you get stuck on a problem - you can work at your own pace, in your own time.
- Interactive learning aids: Pearson understands that you are an individual and that you learn in a specific way. If you are struggling with problem in MyStatLab there are a variety of different hints and tools that can help you get to the right answer on your own: Help me solve this, View an Example, an eBook, videos and more. These are specifically designed to complement your personal learning style and to make your learning experience more enjoyable.

HOW TO ACCESS MYSTATLAB

PEARSON ALWAYS LEARNING

How to Register and Enrol in Your MyStatLab Course

Welcome to STA1510 and MyStatLab! Your instructor has set up a MyStatLab course for you so you can engage with your course content in an enjoyable and interactive manner.

The first thing you need to do is go and buy your new prescribed textbook, with MyMathLab access card, from any official Unisa bookseller:

To join your instructor's course, please complete the following **two** steps:

1. **REGISTER** for MyStatLab, and,
2. **ENROL** in your instructor's course

To register, you will need:

1. A valid e-mail address;
2. The **access code** that came with your new prescribed textbook; and
3. The STA1510 course ID: (will be provided in Tutorial Letter 102 OR please ask your lecturer at phone number 011 670 9254).

Step 1: Register for MyStatLab

1. Go to http://www.mymathlab.com and click the **Students** button, in the Register section.
2. Choose **Register with an Access Code**
3. Follow the instructions to set up your login and password and register for your course.

Step 2: Enrol in your instructor's course

1. Log in to MyStatLab (powered by Mymathlab) at http://www.mymathlab.com with your newly created Login Name and Password
2. Enter your Course ID**: will be provided in Tutorial Letter 102.**
3. Get started with MyStatLab! Work through the sample tests and quizzes so MyStatLab can create your individual study plan.

PEARSON ALWAYS LEARNING

Having trouble with registration and enrolment? Go to Pearson 24/7 customer support

Pearson has a 24/7 support website with professionals dedicated to helping you sort out any technical problems you may be having.

For assistance go to http://247xl.custhelp.com. You can:

- Browse through Frequently Asked Questions;
- Search the Pearson knowledge base;
- Send an email; or
- Participate in a live chat.

Pearson wishes you all the best in your course. We know that MyStatLab is going to help you achieve the results you desire.

6 MODULE-SPECIFIC STUDY PLAN

The semester during which you study at UNISA consists of 15 weeks between the last day of registration and the beginning of the examination period, during which time you need to study and understand the contents of the module, complete and submit two assignments, and then prepare for the examination. Therefore it is important that you create a timetable for planning your studies for this module, and all the other modules you take this semester. That this is particularly important in this module – Statistics as a subject needs continuous work, since you will not make sense of later sections if you skip some sections earlier on!

The following time tables are provided as a starting point for your personal schedule.

SEMESTER 1	**Study units for preparing your assignments** Levine and Study Guide:	**From**	**To**
Assignment 1	Study units 1 - 6	Registration	7 March
	Start writing your assignment & submit	8 March	**18 March**
Assignment 2	Study units 7 - 11	19 March	18 April
	Start writing your assignment & submit	19 April	**23 April**
Exam	Prepare for the examination	24 April	Exam

SEMESTER 2	**Study units for preparing your assignments** Levine and Study Guide:	**From**	**To**
Assignment 1	Study units 1 - 6	Registration	20 August
	Start writing your assignment & submit	21 August	**02 September**
Assignment 2	Study units 7 - 11	3 September	23 September
	Start writing your assignment & submit	24 September	**3 October**
Exam	Prepare for the examination	4 October	Exam

7 MODULE PRACTICAL WORK AND WORK-INTEGRATED LEARNING

There are no practicals for this module.

8 ASSESSMENT

8.1 Assessment criteria

The outcomes of this module are given in Section 2.2 of this tutorial letter. These outcomes describe what you should be able to do in order to successfully pass this module. Assignments, examinations, and in some modules projects and portfolios are the ways we use to assess whether you have reached the outcomes.
The criteria we use to assess your work can be summarised as follows:

- You must apply the correct and appropriate formulas, presentations, methods, rules, laws, values from tables, and so on, as required in the question.
- Applying of formulas, methods etc. must be done correctly.

- Results, tests, computer printouts etc. should be interpreted correctly, when you are asked to do so.
- Calculations must be correct and accurate.

The following general comments are valid to all our modules. In some cases the lecturers will give further instructions to keep in mind when completing your work; these will be given in the tutorial letters for that particular module.

8.1.1 Written assignment and examination questions

Please keep the following in mind when answering questions.

- Read the question carefully – you will get zero marks if you end up answering what was not asked for!
- Give full calculations, marks will usually not be given for the end results only.
- Present your solutions clearly. A collection of disjointed formulas and numbers is not the right way to answer questions, please use words to explain what you are doing and why. Use correct mathematical notation and remember that lines of mathematical equations must always be linked to each other – for example with the = sign if they are a series of continuing calculations, or otherwise maybe by the signs for “equals” or “therefore”. See your textbooks and/or study guides for examples.

We strongly recommend that you submit your written assignments through myUnisa, since then the turnaround time for your assignment to get back to you will be shorter, and your assignment can never get lost. For most of the statistics modules we only accept file submissions in the PDF format. You can scan your hand-written assignment into a PDF file; or alternatively you can use a word-processing program with an equation editor (e.g. MSWord) or you can use special mathematical typesetting programs such as LaTeX, and at the end convert your assignment to PDF. Please note that for typed assignments, you must still use all the correct mathematical notations, and include all necessary graphs, diagrams, and so on, just as if you were submitting a hand-written assignment!

8.1.2 Multiple choice questions

- Only one of the given answers is correct. If you believe several to be correct, check your work again!
- We suggest you keep copies of your calculations, so that when you get the results, you can check where you went wrong.

8.2 Assessment plan

The assessment in this module consists of two assignments and an examination.

Your final mark for the module is determined from your year mark and your examination mark. The year mark forms 20% and the examination mark 80% of the final mark. However, there is also a subminimum rule which states that you must get at least 40% in the examination to pass. The year mark is the average of the marks you receive for assignments 1 and 2. An assignment submitted

late or not at all will give you 0%. Finally, you will only get examination admission if you submit the first assignment by its due date.

Assignments and Learning

The assignments prescribed for this module must be seen as an important part of the learning process. As you do the assignment, study the textbook and study guide, consult other resources, discuss the work with fellow students or tutors or do research, you are actively engaged in learning. The typical assignment question is a reflection of a typical examination question. There are fixed submission dates for the assignments and each assignment is based on specific chapters in the prescribed book. These submission dates have been selected such that you will work steadily through the semester.

You MUST complete Assignment 1 by its due date, otherwise you will not get examination admission. In addition, you should complete both assignments as well as you can, since:

- They are the sole contributors towards your year mark; if you do well in your assignments you have a good year mark and that can make all the difference between a pass or fail, or between a distinction or simply a pass! Note that if your year mark is zero, then you must get 59% in the exam to pass the module! Rather play it safe and make sure that your year mark is as good as possible.

- Submitting assignments and getting feedback on how you did in them is the only way you can assess how well you understand the study material.

- The assignment questions prepare you for the examination questions, as they are similar in form and nature – completing the assignments questions means that you are well prepared for the examination, and from your performance on the assignment questions, you will know exactly which areas you need to work more on.

8.3 General assignment numbers

The two assignments are numbered 01 and 02 for each semester.

8.3.1 Unique assignment numbers

Please note that each assignment has its unique six-digit assignment number which has to be written on the cover of your assignment or on the mark reading sheet upon submission. The unique numbers are given in the table in the next section of this tutorial letter; you will also find them in the heading of each set of assignment questions.

8.3.2 Due dates for assignments

The closing dates for the submission of the assignments are:

Assignment for SEMESTER 1	**Sections from the Study Guide check for equivalent chapter in the textbook**	**Due Date**	**Type**	**Unique number**
1	Study units 1 - 6	18 March 2019	Multiple Choice	839340
2	Study units 7 - 11	23 April 2019	Multiple Choice	770414

Assignment for SEMESTER 2	Sections from the Study Guide check for equivalent chapter in the textbook	Due Date	Type	Unique number
1	Study units 1 - 6	2 September 2019	Multiple Choice	772221
2	Study units 7 - 11	03 October 2019	Multiple Choice	866363

8.4 Submission of assignments

In this module, Assignments 1 and 2 are multiple choice assignments. For general information and requirements as far as assignments are concerned, see the brochure *my Studies @ Unisa* which you received with your study material.

Note that if you have access to Internet, the easiest, fastest and safest way to submit assignments is via myUnisa.

To submit an assignment via myUnisa:

- Go to myUnisa.
- Log in with your student number and password.
- Select the module.
- Click on assignments in the menu on the left-hand side of the screen.
- Click on the assignment number you wish to submit.
- Follow the instructions.

Please note: Although students may work together when preparing assignments, each student must write and submit his or her own individual assignment. It is unacceptable for students to submit identical assignments on the basis that they worked together. That is copying (a form of plagiarism) and none of these assignments will be marked. Furthermore, you may be penalised or subjected to disciplinary proceedings by the University.

8.5 Assignments

This tutorial letter 101 contains the assignments for both semesters, so select the semester you are enrolled for and do the set of assignments for that semester only. The assignments for Semester 1 are in Appendix A, pages 18–32. The assignments for Semester 2 are in Appendix B, pages 33–47.

Solutions to the assignments will be posted to ALL students registered for this module after the closing date of the relevant assignment. Solutions will also be available on *myUnisa*.

9 OTHER ASSESSMENT METHODS

There are no other assessment methods for this module.

10 EXAMINATION

10.1 Examination Admission

Currently admission to the examination is only based on the proof that you are actively involved in your studies. This proof is based on the **submission of your first assignment** before a fixed given date. Admission therefore does not rest with the Department of Statistics and if you do not submit that particular assignment in time, we can do nothing to give you admission. Although you are most probably a part time student with many other responsibilities, work circumstances will not be taken into consideration for exemption from assignments or the eventual admission to the examination.

No concession will be made to students who do not qualify for the examination!

10.2 Examination Period

This module is offered in a semester period of fifteen weeks. This means that

- if you are registered for the first semester, you will write the examination in May/June 2019 and should you fail and qualify for a supplementary examination, that supplementary examination will be written in October/November 2019.
- if you are registered for the second semester, you will write the examination in October/November 2019 and should you fail and qualify for a supplementary examination, that supplementary examination will be written in May/June 2020.

The examination section will provide you with information regarding the examination in general, examination venues, examination dates and examination times. Eventually, your results will also be processed by them and sent to you.

10.3 Examination Paper

Your examination will be a **2 hour examination** consisting of multiple choice questions only. You need to have a final mark of 50% to pass this module and 75% to obtain a distinction. The final mark consists of your year mark (20%) and your examination mark (80%).

Should you have a final mark of less than 50%, it implies that you failed the module STA1510. However, should your results be within a specified percentage (from 40% to 49%), you will be given a second chance in the form of a *supplementary* examination on the dates as specified in 10.2. If you fail the examination with less than 40%, the year mark will not count to help you pass.

10.4 Previous Examination Papers

Previous examination papers are available to students on myUnisa. Remember that the examples, exercises, activities in the guide as well as your assignment questions are also indicators of typical examination questions.

10.5 Tutorial Letter with Information on the Examination

In the study guide you are given clear indications of the sections in the textbook that you have to know and can be tested on in the examination. Remember that you have to work continuously and do not treat statistics as any other subject, where it may be possible to study only selected sections of the work. All the topics are interlinked and you will definitely run into trouble if you skip sections!

You are automatically admitted to the exam on the submission of Assignment 01 by a specific date – see Section 10.1. Please note that lecturers are not responsible for exam admission, and ALL enquiries about exam admission should be directed by e-mail to exams@unisa.ac.za.

11 FREQUENTLY ASKED QUESTIONS

The *Study @ Unisa* brochure contains answers to many common questions on how to study at UNISA.

12 SOURCES CONSULTED

No books other than the prescribed book was consulted in preparing this tutorial letter.

13 IN CLOSING

Remember that there are no "short cuts" to studying and understanding Statistics. You need to be dedicated, work consistently and practise, practise and practise some more! If you are an athlete or a football player or a swimmer or ....or play the piano you will know exactly what is meant with this comment! We hope that you will enjoy studying this module and we wish you success in your studies.

Your lecturers

ADDENDUM A: FIRST SEMESTER ASSIGNMENTS

A.1 Assignment 01

ONLY FOR SEMESTER 1 STUDENTS
ASSIGNMENT 01
Unique Nr.: 839340
Fixed closing date: 18 March 2019

This multiple-choice assignment will be marked by computer. Hence the closing date is **fixed** and no extension of time can be granted.

Your answers must be entered on an optical mark reading sheet. But before you attempt that, please study in detail the relevant chapter of the publication *my Studies @ Unisa*. Please make sure that you know how to handle the optical mark reading sheets, since sheets which are marked incorrectly and which are rejected by the computer will not be marked by hand and students will not receive marks for such assignments. The unique number appearing in the box above links your assignment to the corresponding set of answers in the computer. It must therefore be filled in correctly on the optical mark reading sheet.

Note that your assignment will not be returned to you. Please keep a record of your answers so that you can compare them with the correct answers.

In each of the following twenty questions, mark the number of the answer that you think is correct. Each correct answer gives you 5%, adding up to a total of 100%.

QUESTION 1

The following stem–and–leaf display gives the scores of a sample of 30 students on a statistics exam

5	0	2	7						
6	1	5	4	9	8				
7	1	1	2	5	2	6	7	9	9
8	0	1	3	4	7	7	7		
9	6	8	2	3	2	5			

Which statement is incorrect?

1. The median is equal to 78.
2. The mode is equal to 87.
3. 43.33% of the students scored above 80%
4. The range is equal to 48.
5. 10% of the students scored less than 60%

QUESTION 2

Consider the following data set:

33	29	45	60	42	19	52	38	36

Which one of the following statements is incorrect?

1. The mean, $\bar{X} = 39.3333$.
2. The median is 38.
3. The data distribution is negatively skewed.
4. There is no mode.
5. The coefficient of variation is equal to 31.14%

QUESTION 3

In perfectly symmetric distributions which of the following is NOT a correct statement?

1. The distance from the smallest observation to Q_2 is the same as the distance from Q_2 to the largest observations.
2. The mean is equal to the median.
3. The distance from Q_1 to Q_3 is half of the distance from the smallest to the largest observation.
4. The distance from Q_1 to Q_2 equals to the distance from Q_2 to Q_3.
5. The distance from the smallest observation to Q_1 is the same as the distance from Q_3 to the largest observation.

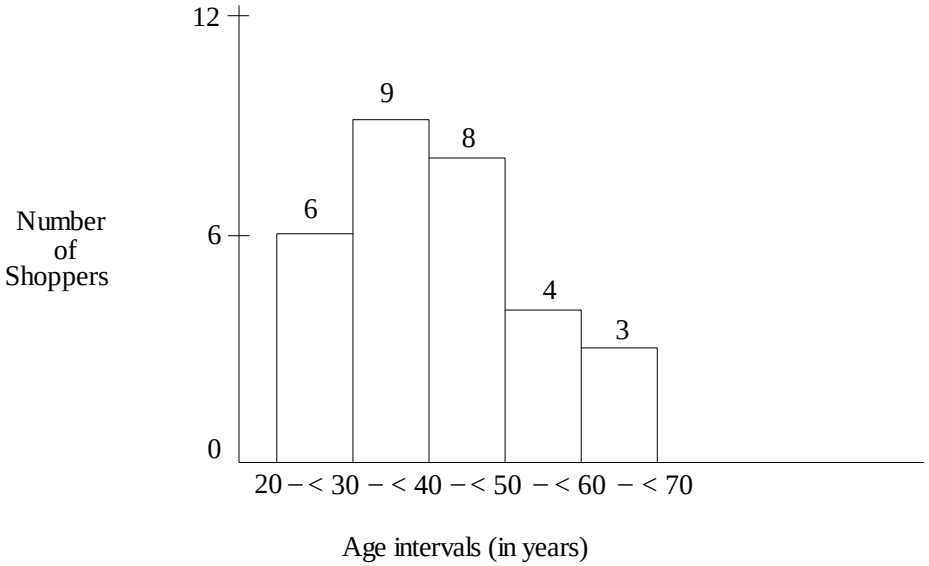
QUESTION 4

In measuring the centre of the data from a positively skewed distribution, the median would be preferred over the mean for most purposes because:

1. The median is the most frequent number while the mean is most likely:
2. The mean may be too heavily influenced by the larger observations and this gives too high an indication of the centre.
3. The median is less than the mean and smaller numbers are always appropriate for the centre.
4. The mean measures the spread in the data.
5. The median measures the arithmetic average of the data excluding outliers.

QUESTION 5

The figure below shows the histogram of the numeric frequency distribution for shoppers' ages.



What is the most frequent age interval of shoppers surveyed?

1. between 20 and 39 years
2. between 30 and 39 years
3. between 20 and 29 years
4. between 30 and 49 years
5. between 60 and 69 years

QUESTION 6

1. Refer to the information in **Question 5**. What percentage of shoppers belong to the most frequent age interval?
2. 30%
3. 26.67%
4. 20%
5. 10%
6. 100%

QUESTION 7

Which one of the following statements is incorrect?

1. A random variable is any attribute of interest on which data is collected and analysed.
2. Ordinal data are categorical data that has an implied ranking.
3. A sample statistic is a measure that describes a characteristic of a sample.
4. Ratio data are categorical data with all categories having equal importance.
5. Continuous data is any number that can occur in an interval.

QUESTION 8

Fill in the missing words to the quote: “statistical methods may be described as methods for drawing conclusions about _____ based on _____ computed from the _____”.

1. statistics, samples, populations
2. populations, parameters, samples
3. statistics, parameters, samples
4. parameters, statistics, populations
5. populations, statistics, samples.

QUESTION 9

An insurance broker is interested in knowing the occupations and gender of the residents of a small town. After a survey he found the information shown in the summary table below.

Occupation	Gender	
	Male	Female
Teacher	20	46
Farmer	18	6
Business owner	12	8

Determine the probability that a person picked at random from this town is a business woman?

1. 0.1818
2. 0.0727
3. 0.5455
4. 0.1091
5. 0.1333

QUESTION 10

Refer to the information in **Question 9**. Determine the probability that a person picked at random from this town is not a teacher?

1. 0.60
2. 0.1818
3. 0.40
4. 1.00
5. 0.4545

QUESTION 11

If events A and B are independent $P(A) = 0.40$ and $P(B) = 0.30$. Which of the following statements is incorrect?

1. $P\left(A'\right) = 0.60$
2. $P(A \text{ and } B) = 0.12$
3. $P(A|B) = 0.40$
4. $P(A \text{ or } B) = 0.58$
5. $P(B|A) = 0.40$

QUESTION 12

If $P(A) = 0.2$, $P(B) = 0.3$ and $P(A/B) = 0.9$, what is $P(A \text{ and } B)$?

1. 0.18
2. 0.42
3. 0.27
4. 0.06
5. 0.15

QUESTION 13

A box of 7 gloves contains two left–handed gloves and five right–handed gloves. If two gloves are randomly selected from the box without replacement, what is the probability that there will be one right–handed glove and one left–handed glove selected?

1. 0.4762
2. 0.4082
3. 0.0476
4. 0.2381
5. 0.8844

QUESTION 14

The manager of a large computer network has developed the following probability distribution of the number of interruptions per day:

Interruptions (X)	0	1	2	3	4
$P\,(X)$	0.10	0.2	?	0.15	0.05

Which of the following statements is correct?

1. $E\,(X) = 1.58$
2. $P\,(0 \leq X \leq 3) = 0.95$
3. $P\,(X \geq 2) = 0.90$
4. $P\,(1 < X < 4) = 0.85$
5. The variance, $\sigma^2 = 0.8660$.

QUESTION 15

A car insurance broker found that the number of policy sales follows a Poisson distribution with an average of three car insurance policies sold per week. Calculate the probability that in a given week he will sell three policies?

1. 0.2240
2. 0.9502
3. 0.0492
4. 0.1992
5. 0.8008

QUESTION 16

Cross-fertilizing a red and a white flower produces red flowers 25% of the time. If we cross–fertilize five (5) pairs of red and white flowers: What is the probability that there will be more than three (3) redflowers in the five (5) offspring?

1. 0.0879
2. 0.1035
3. 0.0156
4. 0.8965
5. 0.2373

QUESTION 17

A neuropsychologist design a test for short–term memory that has a population mean score of 100 and a standard deviation of 5. Assume the scores are normally distributed. Calculate the probability that a randomly selected person will have a score of at least 110?

1. 0.1587
2. 0.0228
3. 0.9772
4. 0.0179
5. 0.00228

QUESTION 18

Refer to the information in **Question 17.** What is the minimum test score for short–term memory for the lowest 2.5% of the population?

1. 100
2. 90.2
3. 109.80
4. 110
5. More than 110

QUESTION 19

Which one of the following statements is correct?

1. $P\,(Z > 1.51) = 0.9345$
2. $P\,(Z < 1.55) = 0.0606$
3. $P\,(Z < -1.63) = 0.9484$
4. $(-1.44 < Z < 0.60) = 0.6050$
5. $P\,(Z > -1.44) = 0.9251$

QUESTION 20

Let z_1 be a z–score that is unknown but identifiable by position and area. If the symmetrical area between a negative z_1 and a positive z_1 is 0.9544, then the value of z_1 must be

1. 0.06
2. 2.50
3. 0.11
4. 2.20
5. 2.00

A.2 Assignment 02

ONLY FOR SEMESTER 1 STUDENTS
ASSIGNMENT 02
Unique Nr.: 770414
Fixed closing date: 23 April 2019

This multiple-choice assignment will be marked by computer. Hence the closing date is **fixed** and no extension of time can be granted.

Your answers must be entered on an optical mark reading sheet. But before you attempt that, please study in detail the relevant chapter of the publication *my Studies @ Unisa*. Please make sure that you know how to handle the optical mark reading sheets, since sheets which are marked incorrectly and which are rejected by the computer will not be marked by hand and students will not receive marks for such assignments. The unique number appearing in the box above links your assignment to the corresponding set of answers in the computer. It must therefore be filled in correctly on the optical mark reading sheet.

Note that your assignment will not be returned to you. Please keep a record of your answers so that you can compare them with the correct answers.

In each of the following 15 questions, mark the number of the answer that you think is correct.

QUESTION 1

ShopOnline advertises that 95% of its online orders ship within two (2) working days. You select a random sample of 100 orders received over the past month to audit. The audit reveals that 91 of these orders were shipped on time. Assuming that this is a normal distribution.
What is the probability that at least 90% of the orders in the sample will be shipped on time?

1. 0.0110
2. 0.989
3. 1.96
4. 0.0228
5. 0.9772

QUESTION 2

You would like to rent an unfurnished one–bedroom apartment in Braamfontein, Johannesburg next year. The mean monthly rent for a random sample of 50 apartments advertised on Property24 is R2500. Assume that the population standard deviation is R600 and that the monthly rentals are normally distributed. Create a 90% confidence interval for the mean monthly rent.

1. $2360.42 \leq \mu \leq 2639.58$
2. $2860.42 \leq \mu \leq 2939.58$
3. $2383.68 \leq \mu \leq 2616.32$
4. $2300.42 \leq \mu \leq 2700.48$
5. $2317.57 \leq \mu \leq 2682.43$

QUESTION 3

Dalize kept careful records of the fuel efficiency of her car. After filling the car tank 20 times, she found that a tank covered 600km on average with a sample standard deviation of R50 km.
Create a 95% confidence interval for the average distance covered on one tank.

1. $577.53 \leq \mu \leq 622.47$
2. $578.09 \leq \mu \leq 621.91$
3. $571.15 \leq \mu \leq 628.85$
4. $581.61 \leq \mu \leq 618.39$
5. $500.21 \leq \mu \leq 600.50$

QUESTION 4

A questionnaire was sent out to students of a certain college to find out who is responsible for paying their fees. The researcher found that 30 out of 100 students pay their own fees. Create a 90% confidence interval of the proportion of students who pay their own fees.

1. $0.2102 \leq \pi \leq 0.3898$
2. $0.1933 \leq \pi \leq 0.4067$
3. $0.2247 \leq \pi \leq 0.3753$
4. $0.2414 \leq \pi \leq 0.3586$
5. $0.1818 \leq \pi \leq 0.4182$

QUESTION 5

A random sample of 200 observations shows that there are 36 successes. We want to test at the 1% significance level if the true proportion of successes in the population is less than 24% and made certain calculations.
Which one of the following statements is incorrect?

1. The appropriate hypothesis are $H_0 : \pi \geq 0.24$ versus $H_1 : \pi < 0.24$
2. The value of p is 0.18
3. The standard error associated with this test is 0.0302
4. The test statistic is 1.99
5. The critical value of Z (from the normal table) is $Z < -Z_{0.01} = -2.33$

QUESTION 6

A recent survey predicted that a certain political party would receive exactly 60% of the country's votes. A local study of 450 people was done and found that 300 people would vote for the political party. For testing the original claim at a 5% level of significance, compute the test statistic?

1. 0.6667
2. 0.07
3. 0.0231
4. 3.03
5. -3.03

QUESTION 7

Refer to the information in **Question 6** state the hypothesis and state whether the test is lower–tailed/upper tailed/two–tailed

1. $H_0 : \mu = 300 \qquad H_1 : \mu \neq 300$; two-tailed test
2. $H_0 : p \leq \frac{300}{450} \qquad H_1 : p > \frac{300}{450}$; upper tailed test
3. $H_0 : \pi = 0.60 \qquad H_1 : \pi \neq 0.60$; two-tailed test
4. $H_0 : \pi \geq 0.6 \qquad H_1 : \pi < 0.60$; lower–tailed test
5. $H_0 : \mu = 450 \qquad H_1 : \mu > 450$; upper-tailed test

QUESTION 8

A study on the mode of transport that workers use to commute to work and the associated distance covered by each mode of transport is summarised in the following table:

Distance	Mode of transport			
	Bus	Car	Train	Total
0 km $<$ 10 km	10	32	11	53
10 km $<$ 50 km	35	17	45	97
Total	45	49	56	150

For testing at 1% significance level, the critical value of χ^2 test will be?

1. 6.635
2. 11.345
3. 13.277
4. 5.991
5. 9.210

QUESTION 9

Data was collected for the annual sales quantities and prices for a retail store:

Quantity (units)	Annual Sales (Rands)
500	2500
800	2525
750	2600
820	2580
950	2860

The regression coefficients were calculated as $b_0 = 2112.80$ and $b_1 = 0.67$.
Select the correct statement

1. The relationship between quantities and annual sales appears to be linear and negative.
2. The least squares regression line is $y = 0.67 + 2112.80x$.
3. The predicted annual sales figure if 600 units are sold is R2514.80.
4. When b_1 is positive, i.e. 0.67 sales increases as units sold decreases.
5. If 940 units are sold, the estimated annual sales from the regression line will be R1756.10.

QUESTION 10

Refer to the information in **Question 9**. Identify the **incorrect** statement.

1. There is a positive relationship between quantity sold and annual sales.
2. The correlation coefficient was calculated to be 0.80.
3. The coefficient of determination is 79.96%
4. Only 63.94% of the change in sales is determined by the quantity of units sold.
5. The regression coefficient b_1 is also positive.

QUESTION 11

A sample of size 200 will be taken at random from an infinite population. Given that the population proportion is 0.60, the probability that the sample proportion will be greater than 0.58 is

1. 0.580
2. 0.762
3. 0.281
4. 0.008
5. 0.719

QUESTION 12

In testing the hypothesis $H_0 : \mu = 50$ against $H_1 : \mu < 50$ where population variance is known, it was found that the standardized test statistic is $z_{STAT} = -1.59$. The p–value is then equal to:

1. 0.1118
2. 0.0559
3. 0.9441
4. 0.4441
5. 0.8882

QUESTION 13

To test if the absence of workers from their job occurs at a higher rate on cold days than on warm days, a company took a sample of 400 days and the results were as detailed below. At the 0.10 level of significance, is there evidence of a relationship between weather patterns and absence from work?

Weather Pattern	Absence from work	
	Yes	No
Cold	10	110
Warm	11	269

1. Since χ^2_{STAT} is greater than the critical value do not reject the null hypothesis of independence.
2. Since χ^2_{STAT} is less that the critical value do not reject the null hypothesis of independence.
3. Since χ^2_{STAT} is greater than the critical value, reject the null hypothesis of independence.
4. Since χ^2_{STAT} is less than the critical value, reject the null hypothesis of independence.
5. More information is required to either reject the null hypothesis or not reject it.

QUESTION 14

How do you interpret a coefficient of determination, r^2, equal to 0.82?
Choose the correct answer below.

1. The interpretation is that 18% of the variation in the independent variable can be explained by the variation in the dependent variable.
2. The interpretation is that 82% of the variation in the dependent variable can be explained by the variation in the independent variable.
3. The interpretation is that 0.18% of the variation in the dependent variable can be explained by the variation in the independent variable.
4. The interpretation is that 0.82% of the variation in the independent variable can be explained by the variation in the dependent variable.
5. Only 0.82% of the variability in the dependent variable is due to factors other than what is accounted for by the linear regression.

QUESTION 15

Consider the following regression equation

$$\begin{aligned} \hat{Y}_i &= -0.3517 + 1156X_i \text{ with} \\ \sum_{i=1}^{30} Y_i &= 59.97, \quad \sum_{i=1}^{30} Y_i^2 = 155.3025 \quad \text{and} \\ \sum_{i=1}^{30} X_i Y_i &= 1496.69 \end{aligned}$$

Determine the coefficient of correlation.

1. 0.9047
2. 0.9512
3. -0.9512
4. -0.9047
5. 0.0465

ADDENDUM B: SECOND SEMESTER ASSIGNMENTS

B.1 Assignment 01

ONLY FOR SEMESTER 2 STUDENTS
ASSIGNMENT 01
Unique Nr.: 772221
Fixed closing date: 02 September 2019

This multiple-choice assignment will be marked by computer. Hence the closing date is **fixed** and no extension of time can be granted.

Your answers must be entered on an optical mark reading sheet. But before you attempt that, please study in detail the relevant chapter of the publication *my Studies @ Unisa*. Please make sure that you know how to handle the optical mark reading sheets, since sheets which are marked incorrectly and which are rejected by the computer will not be marked by hand and students will not receive marks for such assignments. The unique number appearing in the box above links your assignment to the corresponding set of answers in the computer. It must therefore be filled in correctly on the optical mark reading sheet.

Note that your assignment will not be returned to you. Please keep a record of your answers so that you can compare them with the correct answers.

In each of the following twenty questions, mark the number of the answer that you think is correct. Each correct answer gives you 5%, adding up to a total of 100%.

QUESTION 1

The following stem–and–leaf display gives the scores of a sample of 30 students on a statistics exam

5	0	2	7						
6	1	5	4	9	8				
7	1	2	2	5	2	6	7	9	9
8	0	1	3	4	7	7	7		
9	6	8	2	3	2	5			

Which statement is incorrect?

1. The median is equal to 78.
2. The mode is equal to 87.
3. 40% of the students scored above 80%
4. The range is equal to 48.
5. 10% of the students scored less than 60%

QUESTION 2

The following is a stem–and–leaf display representing the amount of Petrol purchased, in litres.

4	1	5	8				
5	0	2	2	5	9		
6	1	2	5	5	6	6	7
7	0	3					

Which one of the following statements is correct?

1. The range is 29.
2. The mode is 65.
3. The fifth smallest value is 2.
4. The median is 61.
5. The mean, $\bar{X} = 68.06$.

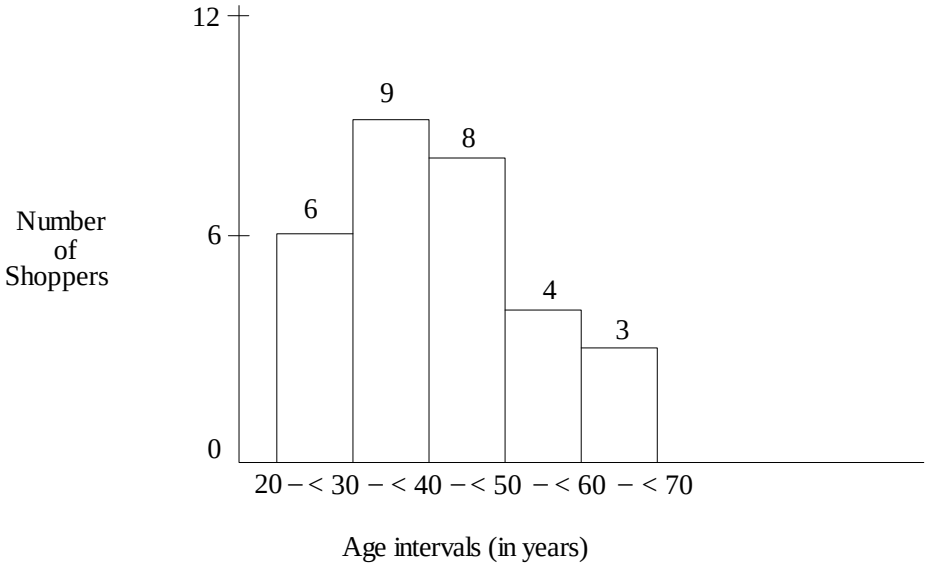
QUESTION 3

In perfectly symmetric distributions, which of the following is NOT a correct statement?

1. The distance from Q_1 to Q_2 equals to the distance from Q_2 to Q_3.
2. The distance from the smallest observation to Q_1 is the same as the distance from Q_3 to the largest observation.
3. The distance from the smallest observation to Q_2 is the same as the distance from Q_2 to the largest observation.
4. The distance from Q_1 to Q_3 is half of the distance from the smallest to the largest observation.
5. The mean is equal to the median.

QUESTION 4

The figure below shows the histogram of the numeric frequency distribution for shoppers' ages.



How many shoppers are between 20 and 29 years of age?

1. 3 shoppers
2. 4 shoppers
3. 6 shoppers
4. 8 shoppers
5. 7 shoppers

QUESTION 5

1. Refer to the information in **Question 4**. What percentage of shoppers surveyed are 50 years or older?
2. 30%
3. 50%
4. 23.33%
5. 10%
6. 13.33%

QUESTION 6

Which one of the following statements is incorrect?

1. The starting salaries of graduates of computer programmes is a continuous variable.
2. The weekly closing price of the stock at Shoprite.com is a discrete variable.
3. Parameter is a characteristic measure of a population.
4. Sample statistic is a measure that describes of a sample.
5. Sampling unit is the object being measured, counted or observed with respect to the random variable under study.

QUESTION 7

An insurance broker is interested in knowing the occupations and gender of the residents of a small town. After a survey he found the information shown in the summary table below.

Occupation	Gender	
	Male	Female
Teacher	20	46
Farmer	18	6
Business owner	12	8

Determine the probability that a person picked at random from this town is a businessman?

1. 0.1818
2. 0.0727
3. 0.5455
4. 0.1091
5. 0.1333

QUESTION 8

Refer to the information in **Question 7**. Determine the probability that a person picked at random from this town is not a farmer?

1. 0.0545
2. 0.1636
3. 0.2182
4. 1.00
5. 0.7818

QUESTION 9

If events A and B are mutually exclusive, $P(A) = 0.40$ and $P(B) = 0.30$. Which of the following statements is correct?

1. $P\left(B'\right) = 0.60$
2. $P(A \text{ and } B) = 0.12$
3. $P(A \text{ or } B) = 0.70$
4. $P(A|B) = 0.4$
5. $P(B|A) = 0.30$

QUESTION 10

The manager of a large computer network has developed the following probability distribution of the number of interruptions per day:

Interruptions (X)	0	1	2	3	4
$P(X)$	0.10	0.2	?	0.15	0.05

Which of the following statements is correct?

1. $P(0 \leq X \leq 3) = 0.8$
2. $P(1 < X < 4) = 0.85$
3. $P(X \geq 2) = 0.2$
4. $E(X) = 1.85$
5. The variance, $\sigma^2 = 0.8660$.

QUESTION 11

A car insurance broker found that the number of policy sales follows a Poisson distribution with an average of three car insurance policies sold per week. Calculate the probability that in a given week he will sell at least one policy?

1. 0.0498
2. 0.1494
3. 0.8008
4. 0.1992
5. 0.9502

QUESTION 12

Cross-fertilizing a red and a white flower produces red flowers 25% of the time. If we cross–fertilize five (5) pairs of red and white flowers: What is the probability that there will be no red flower in the five (5) offspring?

1. 0.0010
2. 0.2637
3. 0.3955
4. 0.2373
5. 1.25

QUESTION 13

A neuropsychologist design a test for short–term memory that has a population mean score of 100 and a standard deviation of 5. Assume the scores are normally distributed. Calculate the probability that a randomly selected person will have a score of less than 95?

1. 0.1587
2. 0.0228
3. 0.9772
4. 0.0179
5. 0.00228

QUESTION 14

Refer to the information in **Question 13.** What is the minimum test score for short–term memory for the highest 2.5% of the population?

1. 100
2. 90.2
3. 109.80
4. 110
5. More than 110

QUESTION 15

Which one of the following statements is correct?

1. $P\,(Z < 1.55) = 0.0606$
2. $P\,(Z < -1.63) = 0.9484$
3. $P\,(-1.44 < Z < 0.60) = 0.6508$
4. $P\,(Z > -1.44) = 0.9394$
5. $P\,(Z > 1.51) = 0.9345$

QUESTION 16

A random sample of 500 households in Acornhoek was selected and several variables were recorded. Which of the following is NOT CORRECT?

1. Household total income is a ratio scaled variable.
2. Household income which was rounded to the nearest R100 can be treated as a continuous variable even though it is “discrete”.
3. The primary language used at home is a nominal scaled variable.
4. Socio–economic status which was coded as $1 =$ low income, $2 =$ middle income, $3 =$ high income and is an interval scaled variable.
5. The number of persons in the household is a discrete variable.

QUESTION 17

Listed below is a stem–and–leaf plot of the times it took 13 students to drink a beverage. Values for stems represents seconds and values for leaves represent tenths of a second.

3	2 4 1 3 5
4	0
5	6
6	1 1 3 7 9
7	
8	2

Which of the following statements is incorrect?

1. The median time is 5.6 seconds.
2. Q_1, the lower quartile is equal to 3.13 seconds.
3. Q_3, the upper quartile is equal to 6.5 seconds.
4. The standard deviation is equal to 1.747 seconds.
5. Five students took less than four seconds to drink the beverage.

QUESTION 18

Given an experiment such that

$$P(A) = 0.5, \quad P(B) = 0.40, \quad P(A|B) = 0.60$$

Calculate $P\left(A \text{ and } B'\right)$

1. 0.5
2. 0.24
3. 1
4. 0.26
5. 0.34

QUESTION 19

In a particular country the average number of suicides reported each month is 2.50. Assume that the number of suicides follows a Poisson distribution. What is the probability that a minimum of two suicides will be reported in a particular month?

1. 0.2565
2. 0.7127
3. 0.2873
4. 0.8000
5. 0.0821

QUESTION 20

Let z_1 be a z–score that is unknown but identifiable by position and area. If the symmetrical area between a negative z_1 and a positive z_1 is 0.9544, then the value of z_1 must be

1. 0.06
2. 2.50
3. 0.11
4. 2.20
5. 2.00

B.2 Assignment 02

ONLY FOR SEMESTER 2 STUDENTS
ASSIGNMENT 02
Unique Nr.: 866363
Fixed closing date: 03 October 2019

This multiple-choice assignment will be marked by computer. Hence the closing date is **fixed** and no extension of time can be granted.

Your answers must be entered on an optical mark reading sheet. But before you attempt that, please study in detail the relevant chapter of the publication *my Studies @ Unisa*. Please make sure that you know how to handle the optical mark reading sheets, since sheets which are marked incorrectly and which are rejected by the computer will not be marked by hand and students will not receive marks for such assignments. The unique number appearing in the box above links your assignment to the corresponding set of answers in the computer. It must therefore be filled in correctly on the optical mark reading sheet.

Note that your assignment will not be returned to you. Please keep a record of your answers so that you can compare them with the correct answers.

In each of the following 15 questions, mark the number of the answer that you think is correct.

QUESTION 1

A research company found that the tyre lifespan for the local town vehicles is normally distributed with a mean of 40 000km and a standard deviation of 4000km. If a random sample of 45 vehicles is selected, what is the probability that the mean lifespan of the tyres for these 45 vehicles is between 39 000 and 41 500km?

1. 0.9476
2. 0.4535
3. 0.4941
4. 0.0059
5. 0.0465

QUESTION 2

A questionnaire was sent out to students of a certain college to find out who is responsible for paying their fees. The researcher found that 30 out of 100 students pay their own fees. Create a 99% confidence interval of the proportion of students who pay their own fees.

1. $0.2102 \leq \pi \leq 0.3898$
2. $0.1933 \geq \pi \leq 0.4067$
3. $0.2247 \leq \pi \leq 0.3753$
4. $0.2414 \leq \pi \leq 0.3586$
5. $0.1818 \leq \pi \leq 0.4182$

QUESTION 3

The following data represent the battery life, in hours, for a random sample of 10 iPod music players.

6.8	5.3	10.5	11.9	10.2	9.0	10.7	8.5	12.0	7.6

Assume the population is known to be normally distributed. Create a 99% confidence interval for the mean number of hours the battery will last in an iPod.

1. $7.444 \leq \mu \leq 11.0560$
2. $6.9751 \leq \mu \leq 11.5249$
3. $7.878 \leq \mu \leq 10.6220$
4. $8.0985 \leq \mu \leq 10.4015$
5. $10.025 \leq \mu \leq 10.4015$

QUESTION 4

You would like to rent an unfurnished one–bedroom apartment in Braamfontein, Johannesburg next year. The mean monthly rent for a random sample of 50 apartments avertised on Property24 is R2500. Assume that the population standard deviation is R500 and that the monthly rentals are normally distributed. Create a 95% confidence interval for the mean monthly rent.

1. $2860.42 \leq \mu \leq 2939.58$
2. $2383.68 \leq \mu \leq 2616.32$
3. $2300.42 \leq \mu \leq 2700.48$
4. $2361.41 \leq \mu \leq 2638.59$
5. $2317.57 < \mu \leq 2682.43$

QUESTION 5

A random sample of 200 observations shows that there are 36 successes. We want to test at the 1% significance level if the true proportion of successes in the population is less than 24% and made certain calculations.
Which one of the following statements is incorrect?

1. The value of p is $\frac{36}{200}$
2. $H_0 : \pi = 0.24$ versus $H_1 : \pi < 0.24$
3. The critical value of Z (from the normal table) is $Z < Z_{0.01} = -2.33$
4. The standard error associated with this test is 0.0302
5. The test statistic is 1.99

QUESTION 6

A simple random sample of 45 employees was selected from a company's population and their mean age was found to be 30 years. Assume this is a normal distribution with a population standard deviation of four years. For testing whether the population mean age is more than 28 years at 1% significance level, determine the p–value for the test.

1. 0.9996
2. 0.50
3. 0.025
4. 0.00040
5. 0.0008

QUESTION 7

Refer to the information in **Question 6**. The rejection area for this test will be:

1. Reject H_0 if the Z_{stat} is > 2.33
2. Reject H_0 if the Z_{stat} is < 2.33
3. Reject H_0 if the Z_{stat} is > 1.28
4. Reject H_0 if the Z_{stat} is > 1.96 or < -1.96
5. Reject H_0 if the Z_{stat} is > 2.576 or < -2.576

QUESTION 8

A study on the mode of transport that workers use to commute to work and the associated distance covered by each mode of transport is summarised in the following table:

Distance	Mode of transport			
	Bus	Car	Train	Total
0 km $<$ 10 km	10	32	11	53
10 km $<$ 50 km	35	17	45	97
Total	45	49	56	150

Select the **incorrect** statement.

1. H_0 : Mode of transport and distance travelled are independent.
2. H_1 : Mode of transport and distance travelled are dependent.
3. Rejection region: reject H_0 if the calculated $\chi^2 < \chi^2_{0.05;2} = 5.991$
4. The χ^2 test statistic value is 28.6997
5. We can conclude that the mode of transport is dependent of the distance travelled by the sampled workers at 5% level of significance.

QUESTION 9

Data was collected for the price and demand of a product:

Demand (units)	Price (Rands)
500	75
700	65
400	80
300	120
250	150

The regression coefficients were calculated as $b_0 = 854.10$ and $b_1 = -4.33$
Select the correct statement

1. The relationship between demand and prices appears to be linear and positive.
2. The least squares regression line is $y = 854.1x - 4.33$
3. The predicted demand if the price is R100 is given as approximately 854.
4. When b_1 is negative, i.e. -4.33 demand increases as price in rands decreases.
5. If the price charged is R140, the estimated demand from the regression line will be 165.

QUESTION 10

Refer to the information in **Question 9**. Identify the **incorrect** statement.

1. There is a positive relationship between demand and price charged on a product.
2. The correlation coefficient was calculated to be -0.8663.
3. The coefficient of determination is 75.05%
4. The regression coefficient b_1 is also negative.
5. Only 75.05% of the change in demand is determined by the prices charged.

QUESTION 11

Given an infinite population with a mean of 75 and the variance of 144, the probability that the mean of a sample of 36 observations, taken at random from this population, exceeds 78 is:

1. 0.4332
2. 0.0987
3. 0.4013
4. 0.0668
5. 0.9332

QUESTION 12

A sample of size 200 will be taken at random from an infinite population. Given that the population proportion is 0.60, the probability that the sample proportion will be greater than 0.58 is

1. 0.580
2. 0.762
3. 0.281
4. 0.008
5. 0.719

QUESTION 13

To test if the absence of workers from their job occurs at a higher rate on cold days than on warm days, a company took a sample of 400 days and the results were as detailed below. At the 0.10 level of significance, is there evidence of a relationship between weather patterns and absence from work?

Weather Pattern	Absence from work	
	Yes	No
Cold	10	110
Warm	11	269

1. Since χ^2_{STAT} is greater than the critical value do not reject the null hypothesis of independence.
2. Since χ^2_{STAT} is less that the critical value do not reject the null hypothesis of independence.
3. Since χ^2_{STAT} is greater than the critical value, reject the null hypothesis of independence.
4. Since χ^2_{STAT} is less than the critical value, reject the null hypothesis of independence.
5. More information is required to either reject the null hypothesis or not reject it.

QUESTION 14

How do you interpret a coefficient of determination, r^2, equal to 0.82?
Choose the correct answer below.

1. The interpretation is that 18% of the variation in the independent variable can be explained by the variation in the dependent variable.
2. The interpretation is that 82% of the variation in the dependent variable can be explained by the variation in the independent variable.
3. The interpretation is that 0.18% of the variation in the dependent variable can be explained by the variation in the independent variable.
4. The interpretation is that 0.82% of the variation in the independent variable can be explained by the variation in the dependent variable.
5. Only 0.82% of the variability in the dependent variable is due to factors other than what is accounted for by the linear regression.

QUESTION 15

Consider the following regression equation

$$\begin{aligned} \hat{Y}_i &= -0.3517 + 1156X_i \text{ with} \\ \sum_{i=1}^{30} Y_i &= 59.97, \quad \sum_{i=1}^{30} Y_i^2 = 155.3025 \quad \text{and} \\ \sum_{i=1}^{30} X_i Y_i &= 1496.69 \end{aligned}$$

Determine the coefficient of correlation.

1. 0.9047
2. 0.9512
3. -0.9512
4. -0.9047
5. 0.0465