

Tutorial Letter 101/3/2018

Statistics Education in Intermediate and Senior Mathematics

MAE202N

Semesters 1 and 2

Department of Mathematics Education

This tutorial letter contains important information
about your module.

BARCODE

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Dear Student

1 INTRODUCTION

Dear Student

We are pleased to welcome you to this module and hope that you will find it both interesting and rewarding. We will do our best to make your study of this module successful. You will be well on your way to success if you start studying early in the semester and resolve to do the assignment(s) properly.

You will receive a number of tutorial letters during the semester. A tutorial letter is our way of communicating with you about teaching, learning and assessment.

This tutorial letter contains important information about the scheme of work, resources and assignments for this module. We urge you to read it carefully and to keep it at hand when working through the study material, preparing the assignment(s), preparing for the examination and addressing questions to your lecturers.

In this tutorial letter (101), you will find the assignments and assessment criteria as well as instructions on the preparation and submission of the assignments. It also provides all the information you need with regard to the prescribed study material and other resources and how to obtain them. Please study this information carefully and make sure that you obtain the prescribed material as soon as possible.

We have also included certain general and administrative information about this module. Please study this section of the tutorial letter carefully.

Right from the start, we would like to point out that **you must read all the tutorial letters** you receive during the semester **immediately and carefully**, as they always contain important and, sometimes, urgent information.

We hope that you will enjoy this module and wish you all the best!!

2 PURPOSE AND OUTCOMES

2.1 Purpose

The purpose of this module, Statistics Education in Intermediate and Senior Mathematics, is to:

- To enable you to develop a professional attitude towards teaching and learning of basic statistics by improving your own teaching and classroom practices.
- To help you better understand how to teach basic statistics to learners in the intermediate and senior phases within the Curriculum Assessment and Policy Statement (CAPS) framework, and to introduce you to some fresh and exciting principles to use in your current practice.
- To teach you how to link statistics to real life.
- To help you gain a better understanding of how your learners learn about basic statistics.

2.2 Outcomes

On completion of this module you should be able to:

- Apply the professional standards for teaching basic statistics.
- Teach through problem solving and modelling, design problem-solving tasks, plan, and teach in a problem-based classroom.
- Explore various ways of representing, analysing and interpreting data.
- To develop your understanding of using technology in teaching and learning of basic statistics.
- Explain the concept of basic statistics.
- Demonstrate an understanding of basic statistics concepts.
- Apply basic statistics in other learning areas.

3 LECTURER(S) AND CONTACT DETAILS

3.1 Lecturer(s)

The following contact details are provided for your convenience (The dialing code for Pretoria is 012. (For foreign students: dial +27 12))

Lecturer

Ms E.G. Makwakwa
 AJH van der Walt Building, Office 7-14, Unisa.
 012 429 4575 (Work) (08:00 - 13:00)
 Email: makwaeg@unisa.ac.za

You should have your student number at hand when you contact the University by telephone.

3.2 Department

The following contact details are for the department under which this module is offered.

Department of Mathematics Education
 (College of Education)
 P O Box 392
 Unisa
 0003

3.3 University

If you need to contact the University about matters not related to the content of this module, please consult the publication *Study@Unisa* that you received with your study material. This booklet 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.

Please note that all administrative enquiries should be directed to the *Study@Unisa*. The details are as follows:

| | |
|----------------------------|--|
| Fax number (RSA) | 012 429 4150 |
| Fax number (international) | +27 12 429 4150 |
| E-mail | study-info@unisa.ac.za |

4 RESOURCES

4.1 Prescribed books

Your prescribed textbook for this module for this year is:

Van de Walle, JA., Karp, K.S. & Bay-Williams, J.M. (2016). *Elementary and middle school Mathematics – teaching developmentally*. 9th edition. New Jersey: Pearson Education.

You must buy the prescribed book.



Earlier editions of the prescribed book, if available, may still be used. There are no major differences between the 8th & 9th editions of the prescribed book *Elementary and middle school Mathematics – teaching developmentally* by Van de Walle et al and below is a table that indicates the correspondence between them.

| Eighth Edition (2014) | Ninth Edition (2016) |
|------------------------------|-----------------------------|
| Chapter 1 (p.1) | Chapter 1 (p.25) |
| Chapter 2 (p.13) | Chapter 2 (p.37) |
| Chapter 3 (p.33) | Chapter 3 (p.57) |
| Chapter 4 (p.53) | Chapter 4 (p.81) |
| Chapter 5 (p.81) | Chapter 5 (p.108) |
| Chapter 6 (p.99) | Chapter 6 (p.128) |
| Chapter 7 (p.119) | Chapter 7 (p.151) |
| Chapter 8 (p.135) | Chapter 8 (p.166) |
| Chapter 9 (p.157) | Chapter 9 (p.191) |
| Chapter 10 (p.181) | Chapter 10 (p.218) |
| Chapter 11 (p.203) | Chapter 11 (p.246) |

| | |
|---|--------------------|
| Chapter 12(p.229) | Chapter 12(p.271) |
| Chapter 13 (p.251) | Chapter 13 (p.301) |
| Chapter 14 (p.275) | Chapter 14 (p.323) |
| Chapter 15 (p.309) | Chapter 15 (p.363) |
| Chapter 16 (p.335) | Chapter 16 (p.395) |
| Chapter 17 (p.359) | Chapter 17 (p.427) |
| Chapter 18 (p.379) | Chapter 18 (p.453) |
| Chapter 19 (p.397) | Chapter 19 (p.477) |
| Chapter 20 (p.425) | Chapter 20 (p.512) |
| Chapter 21(p.459) | Chapter 21(p.550) |
| Chapter 22 (p.481) | Chapter 22 (p.582) |
| Chapter 23 (p.501) | Chapter 23 (p.606) |
| Appendix: Standards for Mathematical Practice (p.521) | Appendix A (A-1) |
| Appendix: Standards for Teaching Mathematics (p.523) | Appendix B (A-5) |
| Appendix: Guide to Blackline Masters (p.525) | Appendix C (A-7) |
| | Appendix D (A-13) |
| References (537) | References (R-1) |
| Index (557) | Index (I-1) |

Please consult the list of official booksellers and their addresses listed in *Study @ Unisa*.

If you have any difficulty obtaining books from these bookshops, please contact the Prescribed Books Section at telephone 012 429 4152 or e-mail vospresc@unisa.ac.za.

4.2 Recommended books

There are no recommended books for this module. We recommend you to read widely in order to keep abreast with contemporary statistics education literature.

4.3 Electronic reserves (e-reserves)

Check the *myUnisa* site for this module and look under “Resources”.

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, other students and administrative departments of Unisa – all through the computer and the internet.

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>.

Please consult the publication *Study @ Unisa*, which you received with your study material, for more information.

4.4 Library services and resources information

For brief information, go to www.unisa.ac.za/brochures/studies

For detailed information, go to <http://www.unisa.ac.za/library>. For research support and services of personal librarians, click on "Research support".

The library has compiled a number of library guides:

- finding recommended reading in the print collection and e-reserves – <http://libguides.unisa.ac.za/request/undergrad>
- requesting material – <http://libguides.unisa.ac.za/request/request>
- postgraduate information services – <http://libguides.unisa.ac.za/request/postgrad>
- finding, obtaining and using library resources and tools to assist in doing research – http://libguides.unisa.ac.za/Research_Skills
- how to contact the library/finding us on social media/frequently asked questions – <http://libguides.unisa.ac.za/ask>
-

You will be required to provide your login details, namely your student number and myUnisa password, in order to access the library's online resources and services. This will enable you to:

- view or print your electronic course material
- request library material
- view and renew your library material
- use the library's e-resources

Requesting books

Students are expected to purchase their own copies of the **prescribed books** listed in Tutorial Letters 101. A limited number of copies are housed in Unisa's libraries, subject to each branch library's lending regulations. Problems experienced in obtaining copies from booksellers should be directed to the Prescribed Book section at e-mail vospresc@unisa.ac.za or telephone +27 12 429 4152.

Electronic requests

The preferred way of requesting **recommended or additional books** is **online** via the library's catalogue. Go to <http://oasis.unisa.ac.za>; or via myUnisa, go to <http://my.unisa.ac.za> > Login > Library > Library catalogue; or for mobile access (AirPAC), go to <http://oasis.unisa.ac.za/airpac>.

Telephonic requests

This can be done on +27 12 429 3133.

Postal requests

Books may also be requested by completing one library book **request card** for each book. Request cards are included in your study package. These should be mailed to:

The Head: Request Services
Department of Library Services
PO Box 392
UNISA
0003

or faxed to +27 12 429 8128.

Enquiries about requested books should be sent to bib-circ@unisa.ac.za. Please note that requests should not be sent to this e-mail address, it is for enquiries.

Telephonic enquiries can be made at +27 12 429 3133/3134; there is also an after-hour voicemail service available at these numbers.

Requesting journal articles

Electronic course material or e-Reserves

Recommended material can be downloaded from the library's catalogue at <http://oasis.unisa.ac.za>. Under *search options*, click on *Course code search* and type in your course code, for example MAE202N. Click on the *Electronic reserves* for the current year. The recommended articles are available in PDF (portable document format).

The **Adobe Reader** should be loaded on your computer so that you can view or print scanned PDF documents. This can be done free of charge at <http://www.adobe.com>.

Additional journal articles

The preferred way of requesting journal articles is **online** via the library's catalogue.

Go to <http://oasis.unisa.ac.za>; or via myUnisa, go to <http://my.unisa.ac.za> > Login > Library > Library catalogue; or for mobile access (AirPAC), go to <http://oasis.unisa.ac.za/airpac>.

Telephonic requests

Telephonic requests can be made at +27 12 429 3133/3134.

Postal requests

Journal articles may also be requested by completing an article **request card** for each item. These should be mailed to the same address as postal requests above or faxed to +27 12 429 8128.

Enquiries about requested articles should be addressed to bib-circ@unisa.ac.za and telephonic enquiries can be made at +27 12 429 3432.

Requesting literature searches

You may request a list of references on your topic from the library's information search librarians if you are enrolled for an undergraduate course which has a research essay. To request a literature search, go to the catalogue's homepage, and click on *Request a Literature Search*, fill in the form and return it to the address provided.

Unisa Library's services

The **Study @ Unisa** booklet, which is part of your registration package, lists all the services offered by the Unisa Library.

(See http://www.unisa.ac.za/contents/myStudies/docs/myStudies_unisa2018.pdf.)

5 STUDENT SUPPORT SERVICES

For information on the various student support systems and services available at Unisa (e.g. student counseling, tutorial classes, language support), please consult the publication *Study@Unisa*, which you received with your study material.

5.1 Study groups

It is advisable to have contact with fellow students. One way to do this is to form study groups. The addresses of students in your area may be obtained from the following department:

Directorate: Student Administration and Registration

PO Box 392

UNISA

0003

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.

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>.

Please consult the publication *Study @ Unisa*, which you received with your study material, for more information on *myUnisa*.

5.3 Tutorials

At the moment, we offer face-to-face tutorials at regional learning centres across South Africa. A tutor can assist you to understand your study material, approach your assignments correctly, and offer you more opportunities for practicing skills, and so on. We would like to start offering this service online for students who choose this option. We would also like start offering a tutor connection to students who have no access to our learning centres or the internet, so that they at least have someone who can help them on request.

A **tutorial** is a regular meeting of students under the leadership of a tutor. The tutor leads you through aspects of the study material with which you are experiencing difficulties.

NB: Please refer to:

- <https://my.unisa.ac.za> for tutorials available at Unisa learning centres throughout the country
— click on the link

5.4 Videoconferencing

Unisa is currently providing tutorials by means of videoconferencing at some of its learning centres. This mode of delivery will be used as and when necessary

Videoconferencing

- provides “live” tutorial support for learners who live in remote areas (where the facilities are available)
- is a viable technology for providing quality tutorial support while reducing costs. Research has shown that there is “no significant difference” between the results obtained by distance learners and those obtained by students who have been taught in a traditional face-to-face environment

6 STUDY PLAN

Use the *Study@Unisa* brochure for general time management and planning skills

7 PRACTICAL WORK AND WORK-INTEGRATED LEARNING

This module will assist you in the planning of your relevant teaching practice lessons on mathematics in the Intermediate and Senior Phase.

8 ASSESSMENT

8.1 Assessment criteria

When assessing your assignments, we will focus on the following:

- Your understanding of the question
- Your ability to reason and accurately perform meaningful computations
- Relevance in answering the question
- Your ability to give examples that enable learners to like and understand statistical concepts
- Mistakes in calculation or reasoning, or any mathematical error, for which marks will be deducted

8.2 Assessment plan

Assignments are seen as part of the learning material for this module. As you do the assignment, study the reading texts, consult other resources, discuss the work with fellow students or tutors or do research, you are actively engaged in learning. Looking at the assessment criteria given for assignments will help you to understand what is required of you more clearly.

There are **two** (2) assignments per semester. Assignment 01 contributes 20% and assignment 02 contributes 80% to the year mark.

In some cases, additional assessment might be available on the *myUnisa* site for your module. For students attending tutorial sessions, tutors may also set additional tasks and give feedback in class.

The nature of the module requires that the students study and cover a wide spectrum of module related knowledge. The content specified in the module should be delivered in a developmental format. As a result knowledge development for this module is addressed in a form of assignments. As you do the assignments you will get an opportunity to engage strongly with the content. **However the lecturer will sample certain questions (items) in the assignment for marking purposes, while others will not be marked. It is only the marked section of the assignment that will be used to compute the semester mark for each student. This arrangement is meant to encourage each student to study all sections (topics) of the module as the knowledge of all these sections will be required for examination purposes.** You are therefore advised to develop your own study schedule (plan, organise yourself and manage your time properly) and begin assignments soon after you received your study material

Please note: Although students may work together when preparing assignments, each student must write and submit his or her own individual assignment. In other words, you must submit your own ideas in your own words, sometimes interspersing relevant short quotations that are properly referenced. 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.

You will receive ZERO if you copy an assignment from a fellow student or directly from a memorandum.



You will receive the correct answers automatically for multiple-choice questions. For written assignments, markers will comment constructively on your work. However, feedback on compulsory assignments will be sent to **all students registered for this module in a follow-up tutorial letter, and not only to those students who submitted the assignments. Also, feedback on compulsory assignments will be uploaded on MyUnisa under official study materials.** The tutorial letter number will be 201, 202, etc.

As soon as you have received the feedback, please check your answers. The assignments and the feedback on these assignments constitute an important part of your learning and should help you to be better prepared for the next assignment and the examination.

8.3 Assignment numbers

8.3.1 General assignment numbers

Assignments are numbered consecutively per module, starting from 01. This module requires two assignments which have to be submitted for the semester. You are compelled to number the assignments as stated in the table below. Incorrect numbering will result in assignments being delayed and maybe lost in the system.

8.3.2 Unique assignment numbers

Unique assignment numbers have to be used for multiple choice as well as for written assignments. Please use the numbers given in the table below.

8.4 Assignment due dates

The following assignments are compulsory and must be submitted:

| Semester 1 | Unique number | Due date | Contribution to year mark | Contribution to final mark |
|------------------------------------|---------------|------------------|---------------------------|----------------------------|
| Assignment 01 (Multiple choice) | 611561 | 5 March 2018 | 20% | 20% |
| Assignment 02 (Written) | 868171 | 23 March 2018 | 80% | |
| Exam | | May/June | 100% | 80% |
| Semester 2 | Unique number | Due date | | |
| Assignment 01 (Multiple choice) | 752398 | 10 August 2017 | 20% | 20% |
| Assignment 02 (Written) | 605583 | 7 September 2018 | 80% | |
| Exam | | October/November | 100% | 80% |

Please Note: The higher your semester mark, the better chance you have to pass the module. To pass this module you need a minimum of 50% final mark. Spend time, and put a lot of effort into Assignments.

Please make sure that your assignments reach the university well before the time.

8.5 Submission of assignments

PLEASE NOTE: Enquiries about assignments (e.g. whether or not the University has received your assignment or the date on which an assignment was returned to you) must be directed to *Study @ Unisa*.

You might also find 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 under the *myUnisa* heading on the screen. This should take you to the *myUnisa* website. You can also go there directly by typing in <http://my.unisa.ac.za>.

Assignments should be addressed to:

The Assignments section
PO Box 392
UNISA
0003

You may submit written assignments and assignments done on mark-reading sheets either by post or electronically via myUnisa. Assignments may not be submitted by fax or email. For detailed information and requirements as far as assignments are concerned, see the brochure Study @ Unisa, which you received with your study material.

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.
- Click on the assignment number you want to submit
- Follow the instructions on the screen.

IMPORTANT

When assignments are handed in electronically:

- **Write or type your name and student number on the first page of the assignment.**
Number all questions ACCURATELY.
- Use a ruler and sharp pencil to draw diagrams. You may also draw diagrams electronically
- All assignments must be submitted in pdf format. No zip files will be accepted

8.6 The assignments

Assignments 01 and 02 are compulsory and have been added to the end of this tutorial letter. Please complete them and submit them as required.

8.7 Other assessment methods

None.

8.8 The examination

DEMARCATION OR “SCOPING” FOR EXAMINATIONS AND ASSESSMENTS

NB: In terms of a decision reached by the College, lecturers may not demarcate or “scope” specific work for examination purposes and examination questions should be based on all the work covering the notional hours of modules. Lecturers should encourage students to learn everything. In cases where competencies or skills are assessed differently during the tuition period, the various methods of assessment will be spelled out clearly by the lecturer in Tutorial Letter 201.

According to Assessment Procedure Manual 2013, paragraph 4.5.2(e), the examination memoranda (guidelines, rubrics, and so on) shall not be made available to students.

8.8.1 Examination admission

The Department of Education requires the university to prove that a student was active during the period of tuition before the student will be subsidised by the Department of Education. Senate has approved that the submission of a compulsory assignment will be used to prove activity and also that students will be admitted to the examination by submitting the assignment. Examination admission is solely dependent on submission of Assignment 01 irrespective of the mark you obtain and whether you have passed or failed. However, should you fail this assignment it will not influence your year mark. Admission to the examination is administered by the Examination Section and not your lecturers. Please study *Study@Unisa* and contact the Examination Section should you have a problem with admission to the examination. Applications for rechecking or remarking should also be submitted to the Examination Section.

8.8.2 How will this work in practice?

In terms of Unisa's assessment policy, a sub-minimum of 40% in the written component(s) of the examination is required. The final mark of a student is a combination of the semester mark and the examination mark but in the case where a student does not obtain the required sub-minimum of 40% in the examination, the semester mark does not count. In such case, the final mark is the mark obtained in the examination.

8.8.3 Examination period

This module is offered in a semester period of 15 weeks. This means that if you are registered for the first semester, you will write the examination in May/June 2018 and the supplementary examination will be written in October/November 2018. If you are registered for the second semester, you will write the examination in October/November 2018 and the supplementary examination will be written in May/June 2019.

During the semester, the Examination Section will provide you with information regarding the examination in general, examination venues, examination dates and examination times.

8.8.4 Previous examination papers

Previous examination papers are available to students. We advise you, however, not to focus on old examination papers only as the content of modules and therefore examination papers changes from year to year. You may, however, accept that the type of questions that will be asked in the examination will be similar to those asked in the activities in your study guide and in the assignments.

9 FREQUENTLY ASKED QUESTIONS

The *Study@Unisa* brochure contains an A-Z guide of the most questions that students ask. Please refer to this brochure for frequently asked questions.

10 SOURCES CONSULTED

None.

11 IN CLOSING

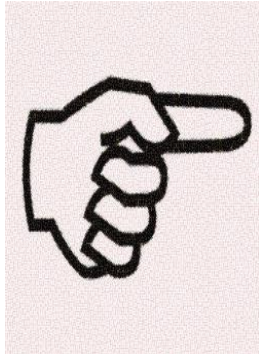
I wish you every success with your studies.

12 ADDENDUM

12.1 ADDENDUM A – ASSIGNMENTS FOR FIRST SEMESTER

NO EXTENSION WILL BE GRANTED.

Take note of this important information:



READ THE FOLLOWING SECTIONS **AGAIN** BEFORE WRITING YOUR ASSIGNMENTS:

- **Section 8.2, Paragraph 4**
- **Section 8.8**
- **Section 8.4**

12.1.1 ASSIGNMENT 01 (COMPULSORY), SEMESTER 1

Due date: 5 March 2018

Unique number: 611561

Contributes 20% to semester mark.

Assignment 01 is compulsory for **examination admission.**

INSTRUCTIONS:

- Answer the questions on the mark-reading sheet provided.
- The method for answering the questions is explained on the mark-reading sheet. Please read the instructions carefully.
- Write the unique number provided above in the space provided on the mark-reading sheet.
- Make sure that you use the correct module code.

Question 1

Which of the following is NOT an example of a source of data?

- A. newspapers
- B. peers
- C. questionnaires
- D. books
- E. None of the above is an example of a source of data.

Question 2

Which of the following is/are an example(s) of a data-collection methods(s)?

- A. peers
- B. observation
- C. newspapers
- D. All of the above
- E. None of the above

Question 3

The Laduma soccer magazine believes that it has a 52% share of the national male readership market of male magazines. When 3000 readers of male magazines were randomly selected and interviewed, 1560 stated that they read Laduma regularly. What is the population of interest?

- A. all male magazine readers
- B. the 1560 magazine readers
- C. the 3000 randomly selected male readers of magazines
- D. All of the above
- E. None of the above

Question 4

Which of the following are sampling methods?

- A. the questionnaire sampling method and interview sampling method
- B. the observation sampling method and experiment sampling method
- C. the internet sampling method and newspaper sampling method
- D. the probability sampling method and non-probability sampling method
- E. All of the above

Question 5

A probability sampling method is any selection method where the sample members are selected from the target population on a purely random basis. Which one of the following is NOT a probability sampling method?

- A. simple random sampling
- B. cluster random sampling
- C. purposive sampling
- D. systematic random sampling
- E. None of the above

Question 6

Which of the following will give a more “accurate” representation of the population from which a sample has been taken?

- A. a large sample based on the convenience sampling technique
- B. a small sample based on simple random sampling
- C. a small cluster sample
- D. a large sample based on simple random sampling
- E. None of the above

Question 7

The process of drawing a sample from a population is known as _____.

- A. sampling
- B. a census
- C. survey research
- D. simple random sampling
- E. None of the above

Question 8

Determining the sample interval (represented by p), randomly selecting a number between 1 and p , and including each p^{th} element in your sample are the steps in _____.

- A. simple random sampling
- B. stratified random sampling
- C. systematic sampling
- D. cluster sampling
- E. None of the above

Question 9

All the following refer to the classification of data, EXCEPT _____.

- A. categorical versus numeric (or qualitative versus quantitative)
- B. nominal, ordinal, interval and ratio-scaled
- C. discrete versus continuous
- D. primary versus secondary
- E. All of the above refer to the classification of data.

Question 10

A random variable is any attribute or characteristic that is being measured or observed. All of the following random variables are of the *data type*: categorical; the *measurement scale*: nominal-scaled; and discrete, EXCEPT _____.

- A. the *different types of aircraft* used by SAA for domestic flights
- B. the *highest qualifications* of employees in an organisation
- C. the *types of child abuse* (physical, sexual, emotional, verbal)
- D. the *marital status* of employees
- E. All of the above are random variables of the categorical, nominal-scaled and discrete type.

Question 11

Which of the following is NOT true about a histogram?

- A. A histogram displays numeric data.
- B. The intervals must be continuous (joined and in sequence).
- C. The width of the bars is arbitrary (but constant).
- D. The width of bars is determined by the interval width.
- E. None of the above is true about a histogram.

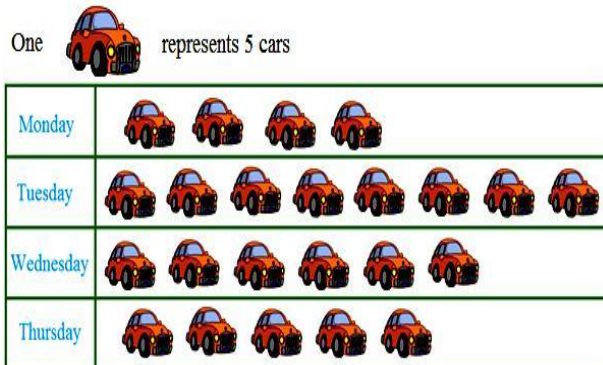
Question 12

Which of the following is NOT true about a bar chart?

- A. A bar chart displays data on a categorical variable.
- B. The width of the bars is determined by the interval width.
- C. The width of the bars is arbitrary (but constant).
- D. Categories can be displayed in order.
- E. None of the above is true about a bar chart.

Question 13





The following pictograph shows how many cars were washed at the car wash during four days of a week. How many more cars were washed on Tuesday than on Thursday?



- A. 8
- B. 3
- C. 12
- D. 15
- E. None of the above

Question 14

Among the ninth-graders, Siphon, Mpho, Betty, Vusi, Carol, Katlego, Precious and Piet are golfers. Which of the following shows how this would look on a tally chart?

- A. 
- B. 
- C. 
- D. 
- E. None of the above

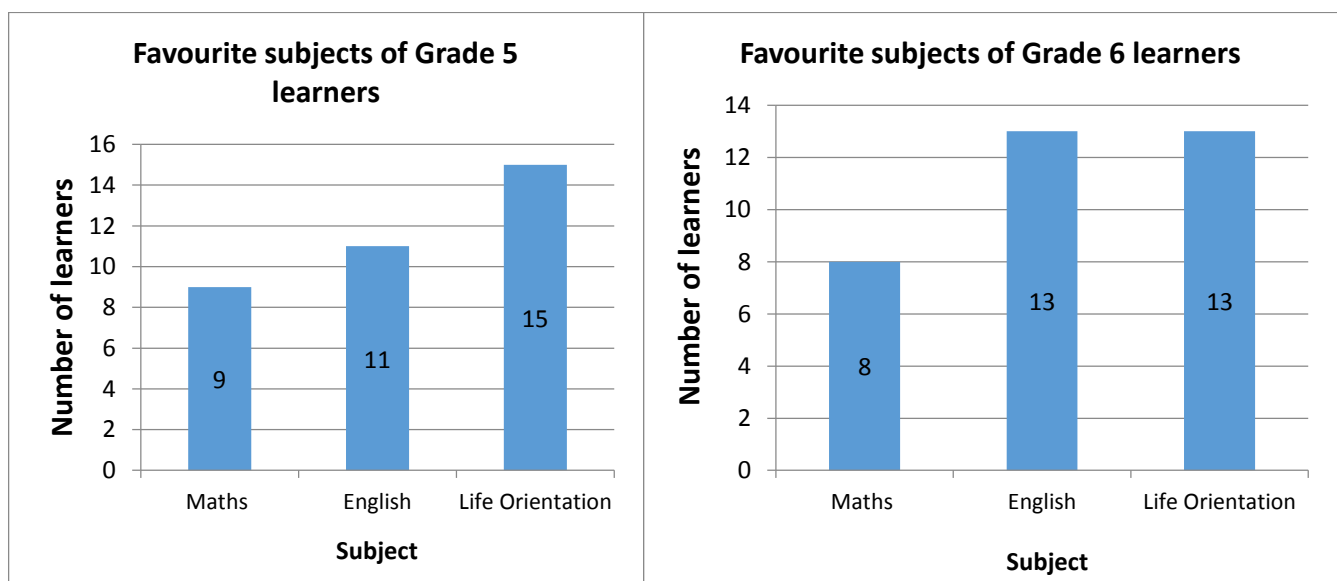
Question 15

The data: 22; 52; 24; 50; 28; 46; 28; 44; 28; 41; 28; 41; 29; 38; 30; 36; 32; 36; 32; 34 shows the scores that 20 students received in a test. Which of the following stem-and-leaf plots represents the scores that the 20 students received in their test?

| | | | | | |
|----|-------------------|---------------|----|--------------|---------------|
| A. | Stems | Leaves | C. | Stems | Leaves |
| | 2 | 2 4 8 8 8 8 9 | | 2 | 2 4 8 8 9 9 9 |
| | 3 | 0 2 2 4 6 6 8 | | 3 | 0 2 2 4 6 6 8 |
| | 4 | 1 1 4 6 | | 4 | 1 1 4 6 |
| | 5 | 0 2 | | 5 | 0 2 |
| B. | Stems | Leaves | D. | Stems | Leaves |
| | 2 | 2 4 8 8 8 9 9 | | 2 | 2 4 8 8 8 9 9 |
| | 3 | 0 2 2 4 6 6 8 | | 3 | 0 2 4 4 6 6 8 |
| | 4 | 1 1 5 6 | | 4 | 1 1 4 6 |
| | 5 | 0 2 | | 5 | 0 2 |
| E. | None of the above | | | | |

Question 16

Which statement about the data in the bar graph is FALSE?

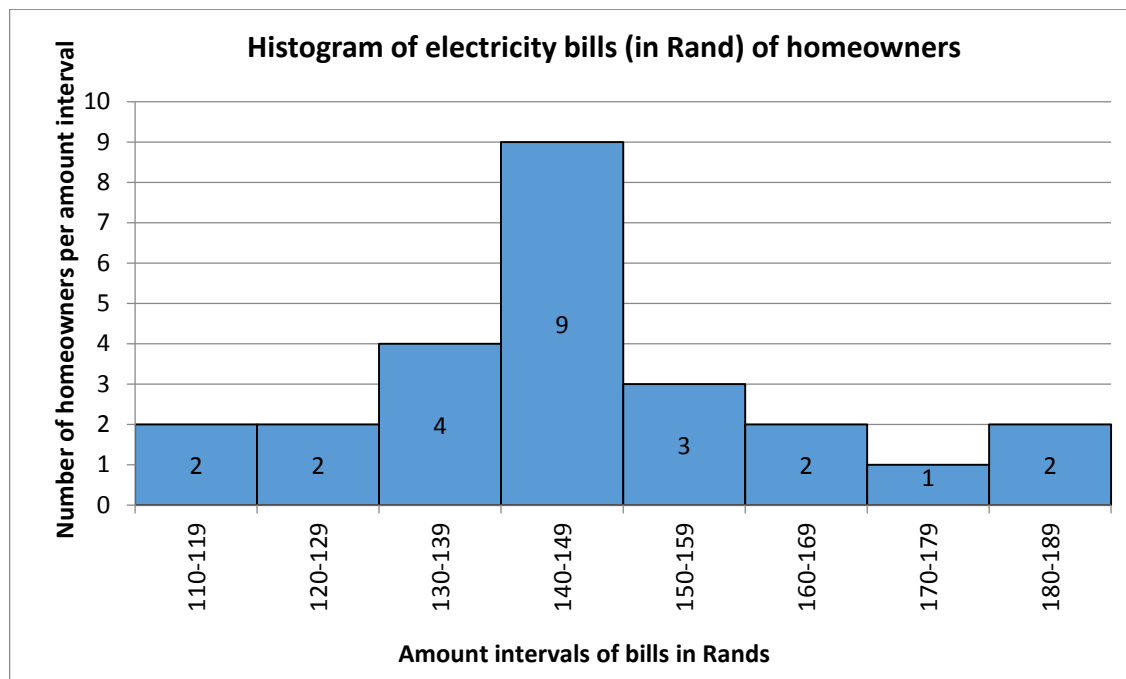


- A. More Grade 5 learners than Grade 6 learners like English.
- B. More Grade 6 learners than Grade 5 learners like Life Orientation.

- C. Most learners in both grades like Maths.
- D. More Grade 6 learners than Grade 5 learners like Maths.
- E. All of the above are false.

Question 17

Choose the correct statement about the following histogram.



- A. Most homeowners pay R180-R189 per electricity bill.
- B. Most homeowners pay less than R100 per electricity bill.
- C. Most homeowners pay R140-R149 per electricity bill.
- D. Most homeowners pay R170-R179 per electricity bill.
- E. All of the above

QUESTIONS 18 TO 27 ARE BASED ON THE FOLLOWING INFORMATION:

The Statistics Education marks (given as percentage) of 50 students in the MAE202N module were: 32; 56; 45; 78; 77; 59; 65; 54; 54; 39; 54; 44; 52; 47; 100; 82; 51; 45; 69; 72; 36; 82; 29; 50; 87; 52; 69; 70; 47; 52; 80; 90; 64; 69; 45; 50; 45; 76; 22; 34; 45; 80; 22; 56; 57; 90; 27; 27; 78; 56.

Question 18

What is the mean mark (correct to the 2nd decimal)?

- A. 58,81
- B. 59,91
- C. 57,24
- D. 57,11
- E. None of the above

Question 19

What is the median mark?

- A. 53
- B. 51
- C. 52
- D. 54
- E. None of the above

Question 20

What is the mode?

- A. 45
- B. 44
- C. 47
- D. 39
- E. None of the above

Question 21

What is the range?

- A. 70
- B. 71
- C. 72
- D. 78
- E. None of the above

Question 22

What is the lower quartile?

- A. 45
- B. 46
- C. 47
- D. 48
- E. None of the above

Question 23

What is the upper quartile?

- A. 70,5
- B. 71,5
- C. 70
- D. 72
- E. None of the above

Question 24

What is the sample variance (correct to the 4th decimal)?

- A. 396,3345
- B. 369,1333
- C. 369,1245
- D. 369,3698
- E. None of the above

Question 25

What is the sample's standard deviation (correct to the 4th decimal)?

- A. 19,9082
- B. 19,2190
- C. 19,2128
- D. 19,2126
- E. None of the above

Question 26

What is the interquartile range?

- A. 24,5
- B. 25,5
- C. 26,5
- D. 27,5
- E. None of the above

Question 27

What is the semi-interquartile range?

- A. 12,25
- B. 13,25
- C. 14,25
- D. 15,25
- E. None of the above

Question 28

For a random experiment, all possible outcomes are called (the) _____.

- A. probability
- B. numerical space
- C. sample space
- D. Both A and B
- E. None of the above

Question 29

An event is _____.

- A. always less than 1
- B. always greater than 1
- C. a collection of outcomes from an experiment
- D. measuring or observing an experimental outcome
- E. None of the above

Question 30

Probability is defined as _____.

- A. an uncertain event
- B. the likelihood than an event will happen
- C. the outcome of an experiment
- D. a number between 0 and 1, inclusive
- E. None of the above

QUESTION 31

Which is of the following is a correct statement about probability?

- A. Probabilities may assume negative values.
- B. Probabilities may be greater than 1.
- C. Probabilities are limited to one decimal place.
- D. Probability values range from 0 to 1, inclusive.
- E. All of the above are correct statements about probability.

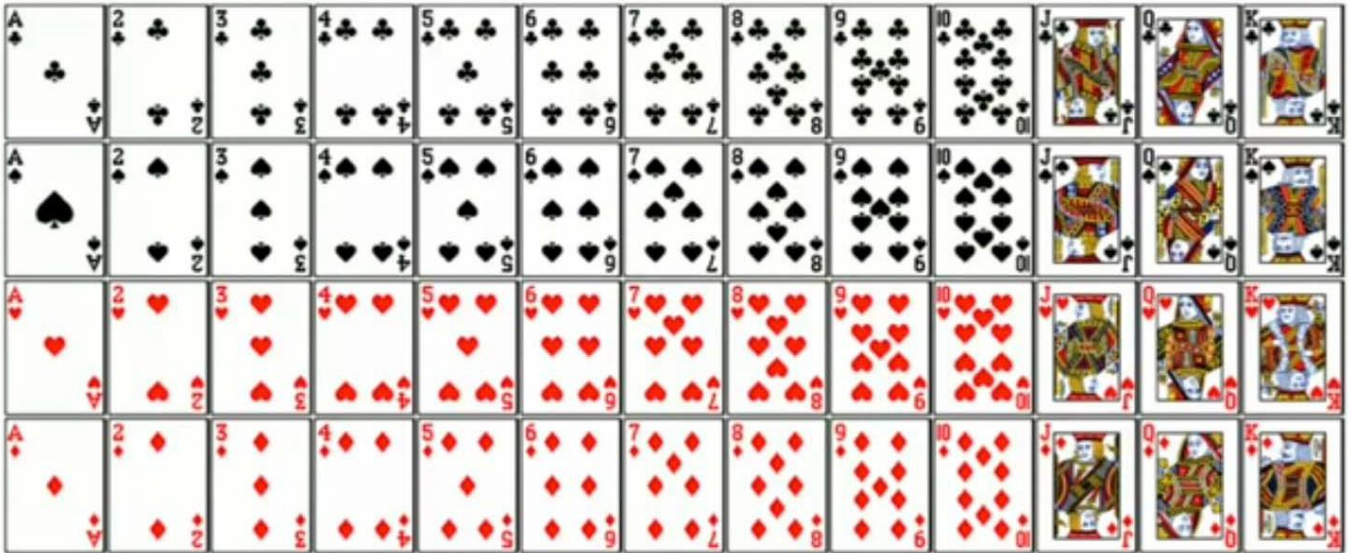
QUESTIONS 32 TO 34 ARE BASED ON THE FOLLOWING INFORMATION:

A deck of 52 cards includes thirteen ranks of each of the four suits: “hearts”, “diamonds”, “spades”, and “clubs”. Within each suit the 13 cards are labelled: Ace (A), 1, 2, 3, 4, ..., 10, Jack (J), Queen (Q), and King (K).

Let: D be the event that a randomly selected card is a diamond,

K be the event that the card is a king,

B be the event that the card has numbers from 2 to 10.

**Question 32**

P(D) is:

- A. 0,27
- B. 0,30
- C. 0,25
- D. 0,28
- E. None of the above

Question 33

P(K) is:

- A. 0,089
- B. 0,099
- C. 0,055
- D. 0,077
- E. None of the above

Question 34

P(B) is:

- A. 0,6923
- B. 0,5920
- C. 0,4920
- D. 0,7920
- E. None of the above

QUESTIONS 35 TO 37 ARE BASED ON THE FOLLOWING INFORMATION:

Consider rolling two ten-sided numbered polyhedrons (sides labeled 0–9).

Question 35

What is the probability that you will roll a 5 and a 7 (order is not important)?

A. $\frac{3}{81}$

B. $\frac{6}{81}$

C. $\frac{2}{50}$

D. $\frac{2}{100}$

E. None of the above

Question 36

What is the probability that the sum of the outcomes will be an even number?

A. $\frac{40}{81}$

B. $\frac{41}{81}$

C. $\frac{50}{100}$

D. $\frac{25}{100}$

E. None of the above

Question 37

What is the probability that the sum of the outcomes will be 10?

A. $\frac{9}{81}$

B. $\frac{10}{81}$

C. $\frac{11}{100}$

D. $\frac{9}{100}$

E. None of the above

Question 38

A salesperson, after calling on a client, records the outcome: sale made (SM), or no sale made (NM). Which of the following is the correct sample space if two clients are visited?

- A. {SM, SM, NM, SM}
- B. {SMSM, SMNM, NMSM, NMNM}
- C. {NM, NM, SM, NM}
- D. None of the above
- E. All of the above

Question 39

If both events CANNOT occur at the same time, then these two events are said to be _____.

- A. mutually exclusive
- B. collectively exhaustive
- C. independent
- D. a joint event
- E. None of the above

Question 40

If the occurrence of event A has nothing to do with the occurrence of event B, then these two events are said to be _____.

- A. mutually exclusive
- B. collectively exhaustive
- C. Independent
- D. A joint event
- E. None of the above

Question 41

Which of the following best expresses the General Addition Rule?

- A. $P(A \text{ or } B) = P(A) + P(B)$
- B. $P(A \text{ or } B) = P(A) + P(B) + P(A \text{ and } B)$
- C. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
- D. None of the above
- E. All of the above

Question 42

The conditional probability that event A, given event B, has occurred, is given by _____.

A. $\frac{P(B)}{P(B \text{ and } A)}$

B. $\frac{P(A \text{ and } B)}{P(B)}$

C. $\frac{P(A \text{ and } B)}{P(A)}$

D. $\frac{P(A)}{P(A \text{ and } B)}$

E. None of the above

Question 43

Which of the following would fit the definition of the “statistical independence” of events A and B?

A. $P(A \cap B) = P(A) \times P(B)$

B. $P(A \text{ or } B) = P(A) + P(B)$

C. $P(A \text{ or } B) = P(A) + P(B) + P(A \text{ and } B)$

D. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

E. None of the above

Question 44

The probability that two events, A and B, both will occur, is given by the multiplication rule as:

A. $P(A \cap B) = P(A) \times P(B)$

B. $P(A \cap B) = P(A|B) \times P(B)$

C. $P(A \cap B) = P(B|A) \times P(B)$

D. Both B and C

E. None of the above

QUESTIONS 45 TO 47 ARE BASED ON THE FOLLOWING QUESTION:

Which of the following pairs of events would you expect to be independent, which mutually exclusive, and which neither?

Question 45

Being a pensioner this year and taking an international trip next year

- A. independent
- B. mutually exclusive
- C. neither
- D. Both A and B
- E. None of the above

Question 46

Studying Statistics Education and being right-handed

- A. independent
- B. mutually exclusive
- C. neither
- D. Both A and B
- E. None of the above

Question 47

Owning a cat and paying veterinary bills

- A. independent
- B. mutually exclusive
- C. neither
- D. Both A and B
- E. None of the above

QUESTIONS 48 TO 51 ARE BASED ON THE FOLLOWING INFORMATION:

The following table is a summary of the energy sources used for cooking. Suppose you pick a house at random from the list of South African residents

The energy sources for cooking

| Energy source | Provinces of South Africa | | | | | | | | | |
|---------------|---------------------------|------------|---------|---------------|------------|---------------|---------|------------|--------------|-------|
| | Eastern Cape | Free State | Gauteng | KwaZulu-Natal | Mpumalanga | Northern Cape | Limpopo | North-west | Western Cape | Total |
| Electricity | 323 | 264 | 1 246 | 700 | 314 | 97 | 183 | 234 | 750 | 4 111 |
| Gas | 48 | 24 | 45 | 56 | 18 | 18 | 27 | 38 | 23 | 297 |
| Paraffin | 391 | 301 | 279 | 300 | 160 | 33 | 127 | 264 | 132 | 1 987 |
| Wood | 537 | 60 | 50 | 520 | 146 | 56 | 627 | 158 | 44 | 2 198 |
| Coal | 12 | 48 | 89 | 34 | 107 | 23 | 23 | 23 | 21 | 380 |
| Total | 1 311 | 697 | 1 709 | 1 610 | 745 | 227 | 987 | 717 | 970 | 8 973 |

Question 48

What is the probability that the household will be from the Western Cape **or** the Eastern Cape?

A. $\frac{970}{8973} + \frac{97}{8973} = \frac{1067}{8973}$

B. $\frac{970}{8973} + \frac{1311}{8973} = \frac{2281}{8973}$

C. $\frac{1311}{8973} + \frac{227}{8973} = \frac{1538}{8973}$

D. Both A and C

E. None of the above

Question 49

What is the probability that the household uses paraffin as a source of energy **or** will be from the Gauteng?

A. $\frac{297}{8973} + \frac{1709}{8973} + \frac{1987}{8973} = \frac{3993}{8973}$

B. $\frac{1987}{8973} + \frac{1987}{8973} - \frac{279}{8973} = \frac{3695}{8973}$

C. $\frac{1987}{8973} + \frac{1709}{8973} - \frac{279}{8973} = \frac{3417}{8973}$

D. Both C and D

E. None of the above

Question 50

What is the probability that the household will be from Limpopo **and** Mpumalanga, if two households were picked one after the other, with replacement?

- A. $\frac{314}{8973} \times \frac{97}{8973} = \frac{30458}{80514729}$
 B. $\frac{987}{8973} \times \frac{745}{8973} = \frac{735315}{80514729}$
 C. $\frac{717}{8973} \times \frac{227}{8973} = \frac{162759}{80514729}$
 D. Both A and B
 E. None of the above

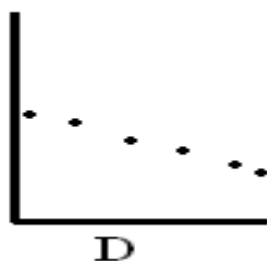
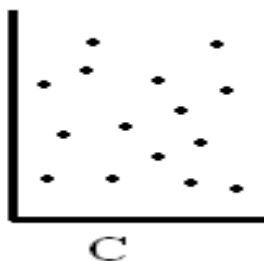
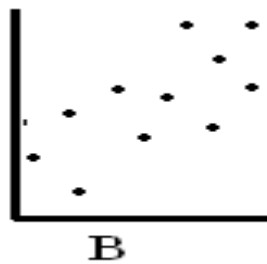
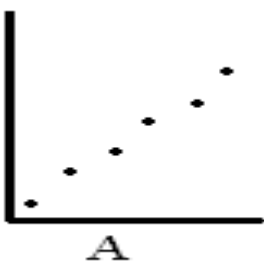
Question 51

What is the probability that the households will both be from the Eastern Cape, if two households were picked one after the other, without replacement?

- A. $\frac{1709}{8973} \times \frac{1709}{8973} = \frac{2920681}{80514729}$
 B. $\frac{1311}{8973} \times \frac{1310}{8972} = \frac{1717410}{80505756}$
 C. $\frac{1311}{8973} \times \frac{1311}{8972} = \frac{1718721}{80505756}$
 D. Both B and C
 E. None of the above

QUESTIONS 52 AND 53 ARE BASED ON THE FOLLOWING INFORMATION:

Graphs A to D show various patterns of relationships between x and y.



Question 52

Graph A shows _____.

- A. a weak linear relationship, positive
- B. a strong linear relationship, negative
- C. no linear relationship
- D. strong linear relationship, positive
- E. a medium-strength linear relationship

Question 53

Graph B shows _____.

- A. a weak linear relationship, positive
- B. a strong linear relationship, negative
- C. no linear relationship
- D. a strong linear relationship, positive
- E. a medium-strength linear relationship, positive

QUESTIONS 54 AND 55 ARE BASED ON THE FOLLOWING INFORMATION:

A scatter plot graphically displays all pairs of data values of the independent and dependent variables.

Question 54

The independent variable is represented by the symbol(s) _____.

- A. y
- B. x
- C. xy
- D. Both A and B
- E. None of the above

Question 55

The dependent variable is also called the _____.

- A. explanatory variable
- B. vertical variable
- C. response variable
- D. Both A and B
- E. None of the above

Total: [55]

12.1.2 ASSIGNMENT 02 (COMPULSORY) – SEMESTER 1

Due date: 23 March 2018

Unique number: 868171

Contributes 80% to semester mark.

Answer ALL the questions.

Question 1

- 1.1 How does one select a simple random sample? List three ways. (3)
- 1.2 The following data was collected to investigate road accidents caused by drunken driving within the community of Soshanguve in 2012 and 2015:

| Accidents caused by drunken driving | | |
|-------------------------------------|------------|------------|
| 2012 and 2015 | | |
| | 2012 | 2015 |
| Motorcars | 40 | 85 |
| Minibuses | 60 | 55 |
| Trucks | 30 | 70 |
| Total | 130 | 210 |

- 1.2.1 Draw a **bar chart** on which you **compare the accidents** caused by drunken driving in the years 2012 and 2015 for the different categories of transport (motorcars, minibuses and trucks). (5)
- 1.2.2 From your bar chart identify which mode of transport had a decrease in accidents from 2012 to 2015. Substantiate your answer. (3)

[11]

Question 2

Write a lesson plan for Grade 7 using the outcome: “At the end of this lesson learners should be able to examine ungrouped numerical data to determine the mean and the mode”, and the following data:

| | | | | | | | |
|----|----|----|----|----|----|----|----|
| 67 | 70 | 71 | 71 | 73 | 74 | 75 | 75 |
| 75 | 77 | 78 | 78 | 78 | 78 | 79 | 80 |
| 81 | 82 | 82 | 83 | 86 | 86 | 87 | 91 |

Guidelines

Describe the activity/activities that will enable the learners to discover the differences between the mean and the mode.

Plan the “before” phase. How will you introduce/present the activity?

Plan the “during” phase. List possible hints you might give to assist the learners.

Plan the “after” phase. How will the learners report their findings? What questions will you ask to assess their understanding? (See Van de Walle, “Planning in the problem based classroom”.)

The lesson plan must be in such a format that the teacher will be able to apply it without any inputs of his/her own. For example, do not merely **say**, “I will have an assessment activity that will assess their understanding” – you must also **show** the worksheet for assessment.

[10]**Question 3**

In the suburb of Mountain View, a **sample** of homeowners were asked what their electricity bills were the previous month. The following table summarises the results:

| Electricity bills (in rand) of a sample of 35 households | | | | | | |
|---|-----|-----|-----|-----|-----|-----|
| 120 | 170 | 145 | 155 | 170 | 125 | 172 |
| 125 | 185 | 140 | 145 | 140 | 130 | 156 |
| 135 | 165 | 146 | 140 | 149 | 125 | 160 |
| 136 | 155 | 148 | 146 | 130 | 128 | 124 |
| 110 | 163 | 150 | 125 | 135 | 145 | 180 |

3.1 Calculate:

3.1.1 the mean (correct to 3 decimal places) (2)

3.1.2 the median (2)

3.2 Which is the better measure of the central tendency for this data – the mean or the median? Explain your answer. (2)

3.3 Calculate:

3.3.1 the variance (correct to 3 decimal places) (3)

3.3.2 the standard deviation (correct to 3 decimal places) (2)

3.3.3 the interquartile range (7)

3.3.4 the semi-interquartile range (2)

3.4 Which is the better measure of the spread of the data – the standard deviation or the interquartile range? Explain your answer. (2)

3.5 Use the class intervals 110-119, 120-129, 130-139, etc. to construct a frequency table for the electricity bills (in rand) of the sample of 35 households. (5)

3.6 Using the same frequency table in 3.5 and class boundaries of 110-119, 120-129, 130-139, etc, construct a histogram to represent the electricity bills. (5)

3.7 From your histogram, determine the modal class of the electricity bills. (1)

3.8 What percentage of households spends less than R145 per month on electricity? (2)

[35]

Question 4

Mr Qhubani sells fruit at the entrances of a university and a hospital. He wants to know whether the sales at the two locations differ. The following table is a summary of his daily sales for 29 days, at the two locations:

| Daily sales of fruit at the hospital entrance (in Rand) | | | | Daily sales of fruit at the university entrance (in Rand) | | | |
|---|-----|-----|-----|---|-----|-----|-----|
| 125 | 130 | 145 | 165 | 145 | 146 | 145 | 145 |
| 167 | 169 | 158 | 171 | 136 | 139 | 136 | 136 |
| 178 | 176 | 168 | 172 | 125 | 125 | 125 | 130 |
| 170 | 175 | 170 | 170 | 147 | 149 | 148 | 147 |
| 175 | 179 | 178 | 175 | 154 | 165 | 156 | 155 |
| 175 | 170 | 130 | 145 | 165 | 148 | 149 | 155 |
| 179 | 171 | 165 | 160 | 149 | 154 | 155 | 156 |
| 176 | | | | 150 | | | |

- 4.1 Draw a back-to-back **ordered** stem-and-leaf diagram of this data. (10)
- 4.2 Draw the box plot for the daily sales of fruit at the university entrance. List all the values needed for this plot. (8)

[18]**Question 5**

A works engineer is of the opinion that the number of defective items produced hourly is directly proportional to the speed (revolutions per minute) of the lathe on which the item is produced. The following is a table of six random observations, each representing one hour.

| Speed of lathe | Number of defects |
|----------------|-------------------|
| 232 | 8 |
| 148 | 12 |
| 180 | 7 |
| 266 | 10 |
| 230 | 9 |
| 206 | 8 |

- 5.1 Identify the dependent and the independent variables. (2)
- 5.2 Draw a scatter plot of the sample data. (4)
- 5.3 Comment on the likely relationship between the two variables (i.e. the speed of the lathe and the number of defects). (1)

[7]

Question 6

The Mamelodi High football team has two matches to play in the provincial league. There are three possible outcomes in each match: the team can win (W), the team can lose (L) or the two teams can draw (D). List all the possible outcomes.

[4]

Question 7

A bag contains 4 yellow balls and 8 white balls.

- 7.1 Calculate the probability that the first ball drawn at random will be yellow. (2)
- 7.2 Calculate the probability that the first ball drawn at random will be white. (2)
- 7.3 Calculate the probability that for the second draw you will get white if the first ball was white and was returned to the bag before the second draw was made. (4)
- 7.4 Calculate the probability that for the second draw you will get white if the first ball was white and was not returned to the bag. (4)

[12]

Question 8

Consider rolling two seven-sided numbered polyhedrons (sides labeled 0–6).

- 8.1 Summarise all the possible outcomes using a table format. (9)
- 8.2 Calculate the probability of tossing a 4 and a 2. (3)
- 8.3 What is the probability that the sum of the two numbers will be an even number? (3)
- 8.4 What is the probability that the sum of the two numbers will be an odd number? (3)
- 8.5 What is the probability that the sum of the two numbers will be a multiple of 4? (3)
- 8.6 What is the probability that the sum of the two numbers will be less than 8? (3)

[24]**Question 9**

In a certain area 40% of the households are using electricity as a source of energy, 30% are using paraffin and 30% are using coal. The users of electricity use 25% for cooking, 25% for lighting, 20% for heating and 30% for small appliances. Coal is used only for cooking, and paraffin is used for cooking (50%), heating (25%) and lighting (25%).

- 9.1 Summarise all the possible outcomes using a tree diagram and write the probability values on the branches. (11)
- 9.2 What is the probability that a randomly chosen household will be using electricity for lighting? (3)

[14]**Question 10**

The table below shows the speeds of motorists recorded on a road between Swellendam and Robertson.

| Speed in km/h | Frequency | Cumulative frequency |
|--------------------|-----------|----------------------|
| $50 \leq x < 60$ | 25 | 25 |
| $60 \leq x < 70$ | 30 | 55 |
| $70 \leq x < 80$ | 25 | 80 |
| $80 \leq x < 90$ | 50 | 130 |
| $90 \leq x < 100$ | 20 | 150 |
| $100 \leq x < 110$ | 11 | 161 |
| $110 \leq x < 120$ | 14 | 175 |
| $120 \leq x < 130$ | 10 | 185 |

- 10.1 Draw an OGIVE (cumulative frequency graph) to illustrate the data in the table. (7)
- 10.2 Use the graph to estimate:
- 10.2.1 the median speed (2)
- 10.2.2 the interquartile range (5)
- 10.2.3 the semi-interquartile range (1)

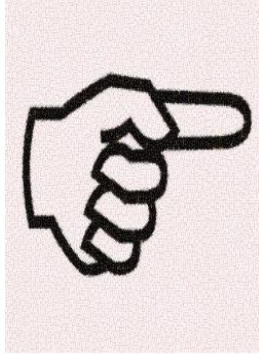
[15]

TOTAL: 150

12.2 ADDENDUM B – ASSIGNMENTS FOR SECOND SEMESTER

NO EXTENSION WILL BE GRANTED.

Take note of this important information:



READ THE FOLLOWING SECTIONS **AGAIN** BEFORE WRITING YOUR ASSIGNMENTS:

- **Section 8.2, Paragraph 4**
- **Section 8.8**
- **Section 8.4**

12.2.1 ASSIGNMENT 01 (COMPULSORY) – SEMESTER 2

Due date: 10 August 2018

Unique number: 752398

Contributes 20% to year mark.

Assignment 01 is compulsory for **examination admission**.

INSTRUCTIONS:

- Answer the questions on the mark-reading sheet provided.
- The method for answering the questions is explained on the mark-reading sheet. Please read the instructions carefully.
- Write the unique number provided above in the space provided on the mark-reading sheet.
- Make sure that you use the correct module code.

Question 1

Which of the following is/are an example(s) of a source(s) of data?

- A. newspapers
- B. peers
- C. observation
- D. Both B and C
- E. Both A and B

Question 2

Which of the following is/are an example(s) of a data-collection method(s)?

- A. newspapers
- B. books
- C. observation
- D. peers
- E. None of the above

Question 3

The Laduma soccer magazine believes that it has a 52% share of the national male readership market of male magazines. When 3000 readers of male magazines were randomly selected and interviewed, 1560 stated that they read Laduma regularly. What is the population of interest?

- A. the male-magazine readership
- B. all male (as opposed to female) magazine readers
- C. the 3000 randomly selected male readers of magazines
- D. the 1560 male readers of magazine
- E. a male

Question 4

Which one of the following options are sampling methods?

- A. the questionnaire sampling method and the interview sampling method
- B. the observation sampling method and the experiment sampling method
- C. the probability sampling method and the non-probability sampling method
- D. the internet sampling method and the newspaper sampling method
- E. All of the above

Question 5

A probability sampling method is any selection method where the sample members are selected from the target population on a purely random basis. Which one of the following is/are a probability sampling method(s)?

- A. systematic random sampling
- B. cluster random sampling
- C. convenience sampling
- D. Both A and B
- E. Both C and D

Question 6

Which of the following techniques yields a simple random sampling?

- A. choosing volunteers from an introductory psychology class to participate
- B. numbering all the elements of a sampling frame and then using a random number table to pick cases from the table
- C. randomly selecting schools, and then sampling everyone within the school
- D. listing the individuals by ethnic group and choosing a proportion from within each ethnic group at random
- E. None of the above

Question 7

The process of drawing a sample from a population is known as _____.

- A. a census
- B. a survey research
- C. sampling
- D. All of the above
- E. None of the above

Question 8

Determining the sample interval (represented by n), randomly selecting a number between 1 and n , and including each n^{th} element in your sample, are the steps in _____.

- A. simple random sampling
- B. cluster sampling
- C. systematic sampling
- D. stratified random sampling
- E. None of the above

Question 9

All of the following are classifications of data EXCEPT _____.

- A. primary versus secondary
- B. categorical versus numeric (or qualitative versus quantitative)
- C. nominal, ordinal, interval and ratio-scaled
- D. discrete versus continuous
- E. All of the above are classifications of data.

Question 10

A random variable is any attribute or characteristic that is being measured or observed. All the following random variables are of the *data type*: numeric, the *measurement scale*: ratio-scaled, and continuous, EXCEPT _____.

- A. the *ages* of Grade 3 learners (7,10 years; 8,6 years)
- B. the *floor area* of Edgars stores (419,2 m²; 3336,8 m²)
- C. the *mass (in kg)* of bags of books (12,8 kg; 15,9 kg)
- D. the *time taken (in minutes)* to work (28,55 minutes; 42,38 minutes)
- E. None of the above are numeric, ratio-scaled and continuous variables.

Question 11

Which of the following is/are true about a bar chart?

- A. It displays data on a categorical variable.
- B. The width of the bars is arbitrary (but constant).
- C. The categories can be displayed in order.
- D. All of the above
- E. Both A and B

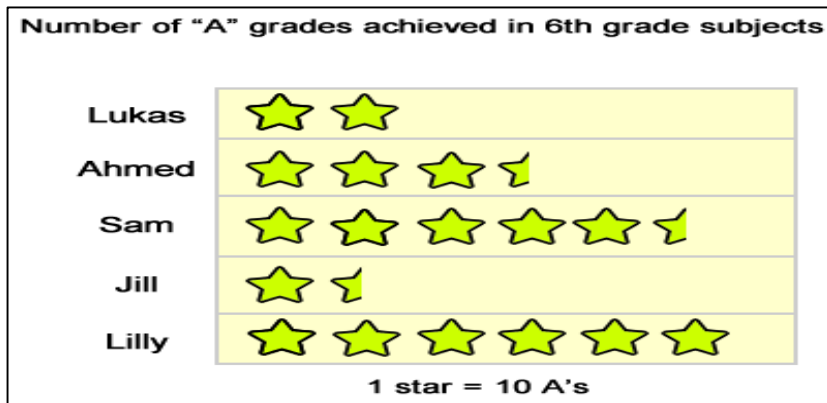
Question 12

Which of the following is/are true about a histogram?

- A. A histogram displays numeric data.
- B. The intervals must be continuous (joined and in sequence).
- C. The width of the bars is determined by the interval width.
- D. All of the above
- E. Both B and D

Question 13

The pictogram below shows the number of "A" grades achieved in 6th-grade subjects.



How many more A's did Lilly get than Jill?

- A. 40
- B. 35
- C. 45
- D. 20
- E. None of the above

Question 14

Among the ninth graders, Sipho, Mpho, Vusi, Carol, Katlego, Precious and Piet are golfers. Which of the following shows how this would look on a tally chart?

- A. III I
- B. III II
- C. III III
- D. III IIII
- E. None of the above

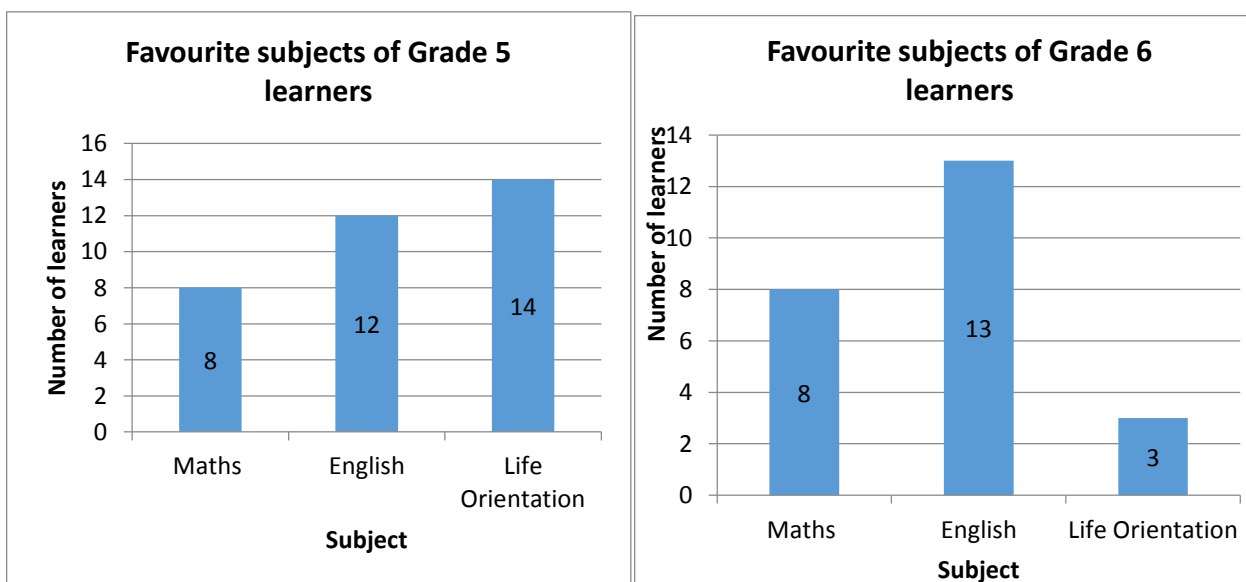
Question 15

The data: 22; 52; 24; 50; 28; 46; 28; 41; 28; 41; 29; 41; 29; 38; 30; 36; 32; 36; 34; 34 shows the scores that 20 students received in a test. Which of the following stem-and-leaf plots represents the scores that the 20 students received in their test?

| | Stems | Leaves | | Stems | Leaves |
|---|-------------------|---------------|---|-------|---------------|
| A | 2 | 2 4 8 8 8 9 9 | C | 2 | 2 4 8 8 9 9 9 |
| | 3 | 0 2 4 4 6 6 8 | | 3 | 0 2 2 4 6 6 8 |
| | 4 | 1 1 1 6 | | 4 | 1 1 4 6 |
| | 5 | 0 2 | | 5 | 0 2 |
| B | 2 | 2 4 8 8 8 9 9 | D | 2 | 2 4 8 8 8 9 9 |
| | 3 | 0 2 2 4 6 6 8 | | 3 | 0 2 4 4 6 6 8 |
| | 4 | 1 1 5 6 | | 4 | 1 1 4 6 |
| | 5 | 0 2 | | 5 | 0 2 |
| E | None of the above | | | | |

Question 16

Which statement about the data in the bar graph is FALSE?

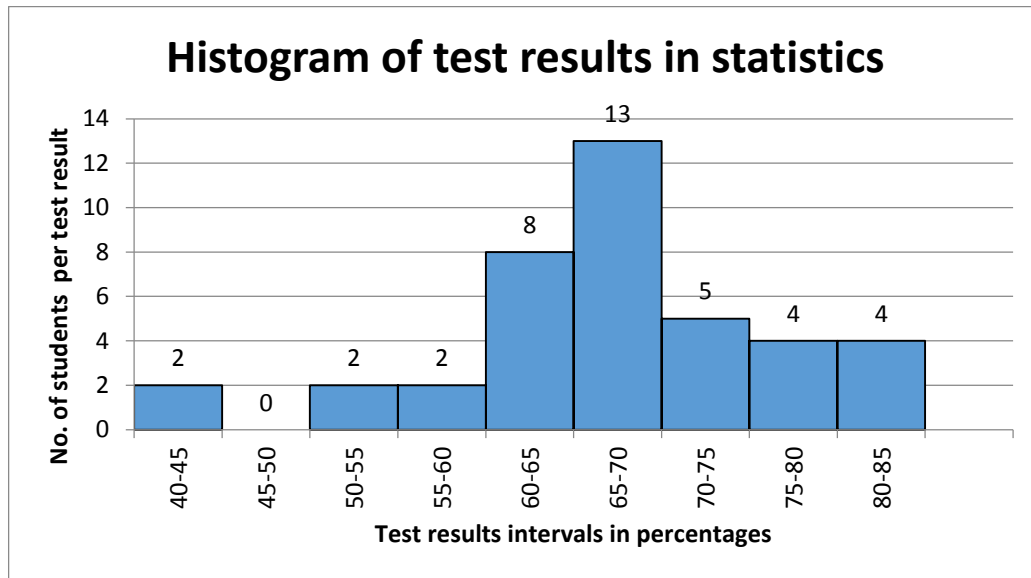


- A. More Grade 6 learners than Grade 5 learners like English.
- B. The same number of learners in both grades like Maths.
- C. More Grade 5 learners than Grade 6 learners like Life orientation.

- D. Most learners in both grades like Maths.
- E. None of the above

Question 17

Which of the statements about the following histogram is correct?



- A. The best score in this Statistics exam was 81.
- B. Most learners scored between 60 and 65.
- C. Most learners scored less than 55 in the Statistics exam.
- D. Most learners studied for the Statistics exam.
- E. None of the above

QUESTIONS 18 TO 27 ARE BASED ON THE FOLLOWING INFORMATION:

The Statistics Education marks (given as percentage) of 50 students in the MAE202N module were: 35; 53; 44; 79; 76; 58; 65; 54; 53; 39; 54; 44; 52; 47; 95; 77; 51; 45; 69; 72; 36; 82; 33; 50; 87; 52; 69; 70; 47; 52; 80; 90; 64; 69; 45; 38; 52; 67; 78; 92; 56; 55; 77; 45; 78; 45; 66; 72; 87; 60

Question 18

What is the mean mark (correct to the 2nd decimal)?

- A. 59,55
- B. 61,54
- C. 61,66
- D. 59,64
- E. 61,12

Question 19

What is the median mark?

- A. 55
- B. 56
- C. 57
- D. 58
- E. 54

Question 20

What is the mode?

- A. 45
- B. 69
- C. 52
- D. 54
- E. All of the above

Question 21

What is the range?

- A. 62
- B. 63
- C. 70
- D. 71
- E. None of the above

Question 22

What is the lower quartile?

- A. 45
- B. 46
- C. 47
- D. 48
- E. None of the above

Question 23

What is the upper quartile?

- A. 73
- B. 74
- C. 75
- D. 78
- E. 76

Question 24

What is the sample variance (correct to the 4th decimal)?

- A. 271,4345
- B. 273,5355
- C. 276,5763
- D. 278,1682
- E. 271,1282

Question 25

What is the standard deviation (correct to the 4th decimal)?

- A. 16,3758
- B. 16,1689
- C. 16,4660
- D. 16,3272
- E. None of the above

Question 26

What is the interquartile range?

- A. 26
- B. 27
- C. 28
- D. 29
- E. All of the above

Question 27

What is the semi-interquartile range?

- A. 13
- B. 13,5
- C. 14
- D. 14,5
- E. All of the above

Question 28

An investor owns two shares which she monitors for a month. At the end of the month she records whether they went up, or down, or remained unchanged. If you let U = up, D= down, N = no change, what is the sample space for this random experiment?

- A. {D, U, N}
- B. {DD, UU, NN}
- C. {UU, UD, UN, DU, DD, DN, NU, ND, NN}
- D. Both A and B
- E. None of the above

Question 29

For a random experiment, all possible outcomes are called (the) _____.

- A. probability
- B. sample space
- C. numerical space
- D. Both A and B
- E. None of the above

Question 30

An event is _____.

- A. always less than 1
- B. measuring or observing an experimental outcome
- C. always greater than 1
- D. a collection of outcomes from an experiment
- E. None of the above

Question 31

Probability is defined as _____.

- A. the likelihood than an event will happen
- B. the outcome of an experiment
- C. an uncertain event
- D. a number between 0 and 1, inclusive
- E. None of the above

Question 32

Which is of the following is a correct statement about probability?

- A. Probabilities may assume negative values.
- B. Probability values range from 0 to 1, inclusive.
- C. Probabilities may be greater than 1.
- D. Probabilities are limited to one decimal place.
- E. All of the above are correct.

QUESTIONS 33 TO 35 ARE BASED ON THE FOLLOWING INFORMATION:

Consider rolling two ten-sided numbered polyhedrons (sides labeled 0–9).

Question 33

What is the probability that you will roll a 3 and a 1 (order is not important)?

- A. $\frac{3}{81}$
- B. $\frac{6}{81}$
- C. $\frac{2}{50}$
- D. $\frac{2}{100}$
- E. None of the above

Question 34

What is the probability that the sum of the outcomes will be an odd number?

- A. $\frac{40}{81}$
- B. $\frac{41}{81}$
- C. $\frac{50}{100}$
- D. $\frac{25}{100}$
- E. None of the above

Question 35

What is the probability that the sum of the outcomes will be 15?

- A. $\frac{9}{81}$
- B. $\frac{5}{81}$
- C. $\frac{4}{100}$
- D. $\frac{5}{100}$
- E. None of the above

Question 36

If both events CANNOT occur at the same time, then these two events are said to be _____.

- A. collectively exhaustive
- B. independent
- C. a joint event
- D. mutually exclusive
- E. None of the above

Question 37

If the occurrence of event A has nothing to do with the occurrence of event B, then these two events are said to be _____.

- A. mutually exclusive
- B. independent
- C. collectively exhaustive
- D. a joint event
- E. None of the above

Question 38

Which of the following best expresses the General Addition Rule?

- A. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
- B. $P(A \text{ or } B) = P(A) + P(B) + P(A \text{ and } B)$
- C. Both A and B
- D. $P(A \text{ or } B) = P(A) + P(B)$
- E. None of the above

Question 39

The conditional probability of event A, given that event B has occurred, is given by:

- A. $\frac{P(B)}{P(B \text{ and } A)}$
- B. $\frac{P(A \text{ and } B)}{P(A)}$
- C. $\frac{P(A)}{P(A \text{ and } B)}$
- D. $\frac{P(A \text{ and } B)}{P(B)}$
- E. None of the above

Question 40

Which of the following would fit the definition of the “statistical independence” of events A and B?

- A. $P(A \text{ or } B) = P(A) + P(B)$
- B. $P(A \text{ or } B) = P(A) + P(B) + P(A \text{ and } B)$
- C. $P(A \cap B) = P(A) \times P(B)$
- D. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
- E. None of the above

Question 41

The probability that two events, A and B, will both occur, is given by the multiplication rule as:

- A. $P(A \cap B) = P(A) \times P(B)$
- B. $P(A \cap B) = P(B | A) \times P(B)$
- C. $P(A \cap B) = P(A | B) \times P(B)$
- D. Both B and C
- E. None of the above

QUESTIONS 42 TO 44 ARE BASED ON THE FOLLOWING QUESTION:

Which of the following pairs of events would you expect to be independent, which mutually exclusive, and which neither?

Question 42

Being a pensioner this year and taking an international trip next year

- A. independent
- B. mutually exclusive
- C. neither
- D. Both A and B
- E. None of the above

Question 43

Being a member of Orlando Pirates football club and studying for a BEd

- A. independent
- B. mutually exclusive
- C. neither
- D. Both A and B
- E. None of the above

Question 44

Owning a dog and paying veterinary bills

- A. neither
- B. independent
- C. mutually exclusive
- D. Both A and B
- E. None of the above

QUESTIONS 45 TO 51 ARE BASED ON THE FOLLOWING INFORMATION:

The following table is a summary of the energy sources used for cooking. Suppose you pick a house at random from the list of South African residents.

Energy sources used for cooking

| Energy source | Provinces | | | | | | | | | Total |
|---------------|--------------|------------|---------|---------------|------------|---------------|---------|------------|--------------|-------|
| | Eastern Cape | Free State | Gauteng | KwaZulu-Natal | Mpumalanga | Northern Cape | Limpopo | North-West | Western Cape | |
| Electricity | 335 | 265 | 1 235 | 695 | 317 | 101 | 189 | 239 | 782 | 4 140 |
| Gas | 33 | 21 | 41 | 53 | 11 | 12 | 21 | 31 | 19 | 242 |
| Paraffin | 321 | 302 | 276 | 292 | 156 | 37 | 120 | 263 | 123 | 1 890 |
| Wood | 527 | 60 | 50 | 520 | 146 | 56 | 627 | 158 | 44 | 2 188 |
| Coal | 18 | 48 | 89 | 34 | 107 | 23 | 23 | 23 | 21 | 386 |
| Total | 1 232 | 694 | 1 689 | 1 592 | 735 | 227 | 978 | 712 | 987 | 8 846 |

Question 45

What is the probability that the household will be a coal user?

- A. $\frac{386}{8846}$
- B. $\frac{1890}{8846}$
- C. $\frac{302}{8846}$
- D. All of the above
- E. None of the above

Question 46

What is the probability that the household will be from the Free State?

- A. $\frac{187}{8846}$
- B. $\frac{694}{8846}$
- C. $\frac{978}{8846}$
- D. All of the above
- E. None of the above

Question 47

What is the probability that the household uses coal as a source of energy **given** that the household is from the Free State?

- A. $\frac{978}{1890}$
 B. $\frac{120}{978}$
 C. $\frac{48}{694}$
 D. All of the above
 E. None of the above

Question 48

What is the probability that the household will be from Mpumalanga **or** Gauteng?

- A. $\frac{735}{8846} + \frac{1689}{8846} = \frac{2424}{8846}$
 B. $\frac{53}{8846} + \frac{33}{8846} = \frac{86}{8846}$
 C. $\frac{292}{8846} + \frac{321}{8846} = \frac{613}{8846}$
 D. All of the above
 E. None of the above

Question 49

What is the probability that the household uses wood as a source of energy **or** will be from KwaZulu-Natal?

- A. $\frac{1592}{8846} + \frac{1689}{8846} - \frac{1233}{8846} = \frac{2346}{8846}$
 B. $\frac{2188}{8846} + \frac{1592}{8846} - \frac{520}{8846} = \frac{3260}{8846}$
 C. $\frac{1890}{8846} + \frac{1689}{8846} - \frac{276}{8846} = \frac{3303}{8846}$
 D. All of the above
 E. None of the above

Question 50

What is the probability that the household will be from the North-West **and** the Free state if two households were picked one after the other, with replacement?

$$A. \frac{1592}{8846} \times \frac{1689}{8846} = \frac{2346}{78251716}$$

$$B. \frac{694}{8846} \times \frac{1689}{8846} = \frac{1172166}{78251716}$$

$$C. \frac{712}{8846} \times \frac{694}{8846} = \frac{494128}{78251716}$$

D. All of the above

E. None of the above

Question 51

What is the probability that the households will both be from the Western Cape, if two households were picked one after the other, without replacement?

$$A. \frac{745}{8846} \times \frac{746}{8845} = \frac{555770}{78242870}$$

$$B. \frac{735}{8846} \times \frac{734}{8845} = \frac{539490}{78242870}$$

$$C. \frac{987}{8846} \times \frac{986}{8845} = \frac{973182}{78242870}$$

D. All of the above

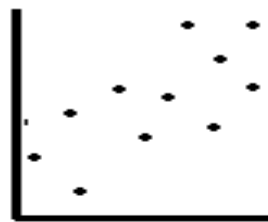
E. None of the above

QUESTIONS 52 AND 53 ARE BASED ON THE FOLLOWING INFORMATION:

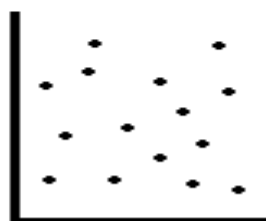
Graphs A to D show various patterns of relationships between x and y.



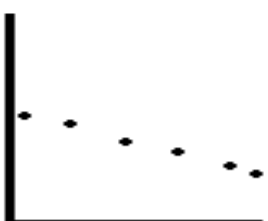
A



B



C



D

Question 52

Graph C shows _____.

- A. a weak linear relationship, positive
- B. a strong linear relationship, negative
- C. no linear relationship
- D. a strong linear relationship, positive
- E. a medium-strength linear relationship

Question 53

Graph D shows _____.

- A. a weak linear relationship, positive
- B. a strong linear relationship, negative
- C. no linear relationship
- D. a strong linear relationship, positive
- E. a medium-strength linear relationship

QUESTIONS 54 AND 55 ARE BASED ON THE FOLLOWING INFORMATION:

A scatter plot graphically displays all pairs of data values of the independent and dependent variables.

Question 54

The dependent variable is represented by the symbol(s) _____.

- A. y
- B. x
- C. xy
- D. Both A and B
- E. None of the above

Question 55

The independent variable is also called the _____.

- A. explanatory variable
- B. vertical variable
- C. response variable
- D. Both A and B
- E. None of the above

TOTAL: 55

12.2.2 ASSIGNMENT 02 (COMPULSORY) – SEMESTER 2

Due date: 7 September 2018

Unique number: 605583

Contributes 80% to semester mark.

Answer ALL the questions.

Question 1

- 1.1 What are the three steps in selecting a systematic sample? (3)
- 1.2 What is a representative sample, and when is it important to obtain a representative sample? (4)
- 1.3 The following data was collected to investigate fatal road accidents in two provinces.

Fatal crashes per month: Nov 2015 – Feb 2016, caused by drunken driving

| | | Limpopo | Western Cape |
|--------------|-----------------|----------------|---------------------|
| 2015 | November | 285 | 170 |
| | December | 210 | 275 |
| 2016 | January | 170 | 155 |
| | February | 200 | 190 |
| Total | | 865 | 790 |

- 1.3.1 Draw a **bar chart** on which you **compare the fatal accidents** caused by drunken driving from November 2015 to February 2016 for the different months, in the two provinces. (5)
- 1.3.2 From your bar chart, identify which province had an increase in accidents from November 2015 to February 2016. Explain your answer. (3)

[15]

Question 2

Write a lesson plan for Grade 6 using the outcome: “At the end of this lesson learners should be able to examine ungrouped numerical data to determine the mode and the median”, and the following data:

| | | | | | | | |
|----|----|----|----|----|----|----|----|
| 67 | 70 | 71 | 71 | 73 | 74 | 75 | 75 |
| 75 | 77 | 78 | 78 | 78 | 78 | 79 | 80 |
| 81 | 82 | 82 | 83 | 86 | 86 | 87 | 91 |

Guidelines

The task:

Describe the activity/activities that will enable the learners to discover the differences between the median and the mode.

Plan the “before” phase. How will you introduce/present the activity?

Plan the “during” phase. List possible hints you might give to assist the learners.

Plan the “after” phase. How will the learners report their findings? What questions will you ask to assess their understanding? (See Van de Walle, “Planning in the problem-based classroom”).

The lesson plan must be in such a format that the teacher will be able to apply it without any inputs of his/her own. For example, do not merely **say**, “I will have an assessment activity that will assess their understanding” – also **show** the worksheet for assessment.

[10]

Question 3

The table below shows the Statistics test results for a group (population) of 60 learners from a school:

| Statistics Test Results | | | | | | | | | | |
|-------------------------|----|----|----|----|----|----|----|----|----|----|
| 71 | 72 | 34 | 82 | 55 | 28 | 50 | 96 | 24 | 45 | 80 |
| 34 | 32 | 29 | 43 | 36 | 51 | 18 | 57 | 64 | 67 | 66 |
| 47 | 45 | 24 | 52 | 53 | 81 | 54 | 66 | 75 | 34 | 71 |
| 39 | 39 | 38 | 24 | 51 | 44 | 52 | 39 | 42 | 55 | 80 |
| 54 | 55 | 36 | 54 | 34 | 80 | 64 | 24 | 55 | 67 | |
| 46 | 46 | 25 | 52 | 53 | 86 | 50 | 46 | 74 | 60 | |

- 3.1 Use the information in the table to calculate:
- 3.1.1 The mean (correct to 3 decimal places) (2)
 - 3.1.2 The median (2)
 - 3.1.3 The mode (2)
- 3.2 Which is the better measure of the central tendency for this data – the mean or the median? Explain your answer. (2)
- 3.3 Calculate:
- 3.2.1 the variance (correct to 3 decimal places) (3)
 - 3.2.2 the standard deviation (correct to 3 decimal places) (2)
 - 3.2.3 the range (2)
 - 3.2.3 the interquartile range (6)
 - 3.2.4 the semi-interquartile range (2)
- 3.4 Which is the better measure of the spread of the data – the standard deviation or the interquartile range? Explain your answer. (3)
- 3.5 Draw and label a box-and-whisker plot to illustrate the dispersion of the Statistics test results. (5)
- 3.6 Present these results in a frequency table. (5)
- 3.7 Draw a histogram of the test results. (6)
- 3.8 What can you conclude from the histogram you have drawn in 3.7? (2)

Question 4

The ages of the 26 patients in one ward of a hospital on a certain night were as follows:

Female: 48; 65; 28; 72; 50; 53; 61; 30; 77; 53; 55; 38; 62

Male : 21; 55; 75; 71; 56; 74; 33; 61; 67; 67; 71; 43; 78

Draw a back-to-back stem-and-leaf diagram to illustrate this information.

[8]

Question 5

The training manager of a company that assembles and exports pool pumps wants to know if there is a link between the number of hours assembly workers spend in training and their productivity on the job. A random sample of 10 assembly workers were selected and their performances evaluated. The data is given as follows:

| Training hours | Output |
|-----------------------|---------------|
| 20 | 40 |
| 36 | 70 |
| 20 | 44 |
| 38 | 56 |
| 40 | 60 |
| 33 | 48 |
| 32 | 62 |
| 28 | 54 |
| 40 | 63 |
| 24 | 38 |

- 5.1 Identify the dependent and independent variables. (2)
- 5.2 Draw a scatter plot of the sample data. (6)
- 5.3 Comment on the likely relationship between the two variables (i.e. hours of training and output). (2)

[10]

Question 6

The table below shows the speeds of motorists recorded on a road between Swellendam and Robertson.

| Speed in km/h | Frequency | Cumulative frequency |
|--------------------|-----------|----------------------|
| $50 \leq x < 60$ | 22 | 22 |
| $60 \leq x < 70$ | 28 | 50 |
| $70 \leq x < 80$ | 29 | 79 |
| $80 \leq x < 90$ | 53 | 132 |
| $90 \leq x < 100$ | 26 | 158 |
| $100 \leq x < 110$ | 10 | a |
| $110 \leq x < 120$ | 12 | b |
| $120 \leq x < 130$ | 10 | c |

- 6.1 What are the values of a , b and c in the table? (3)
- 6.2 Draw an OGIVE (cumulative frequency graph) to illustrate the data in the table. (7)
- 6.3 Use the graph to estimate:
- 6.3.1 the median speed (4)
 - 6.3.2 the interquartile range (8)
 - 6.3.3 the semi-interquartile range (1)

[23]

Question 7

In one bag there are four cards numbered 2, 4, 6 and 8. In another bag there are also four cards, numbered 1, 3, 5 and 7. One card is drawn at random from each bag and the values of the two cards are added together.

- 7.1 Use a table to list all the possible outcomes for the activity. (6)
- 7.2 What is the probability that the sum of the two values will be an even number? (3)
- 7.3 What is the probability that the sum will be less than 11? (3)
- 7.4 What is the probability that the sum will be 11? (3)
- 7.5 What is the probability that the sum will be a multiple of 3? (3)

[18]

Question 8

A packet contains 20 fruit-flavoured sweets. There are four pineapple-flavoured, five melon-flavoured, two lemon-flavoured, three banana-flavoured and six strawberry-flavoured sweets.

- 8.1 Sophy picks a sweet from the packet without looking. What is the probability that she will pick either a melon-flavoured or a lemon-flavoured sweet? (4)
- 8.2 Lebo does not like banana-flavoured or melon-flavoured sweets. She likes all the other flavours. What is the probability that she will pick a sweet that she likes? (3)

[7]

Question 9

A bag has 9 red balls and 3 blue balls in it. First one ball is drawn and then a second ball is drawn without the first being put back.

- 9.1 Calculate the probability that the first ball drawn will be red. (2)
- 9.2 Calculate the probability that both balls will be blue. (3)
- 9.3 Calculate the probability that one ball will be blue and the other red, in any order. (3)

[8]

Question 10

The following table is a summary of the energy sources used for cooking.

| Energy source | Provinces | | | | | | | | | Total |
|---------------|--------------|------------|---------|---------------|------------|---------------|---------|------------|--------------|-------|
| | Eastern Cape | Free State | Gauteng | KwaZulu-Natal | Mpumalanga | Northern Cape | Limpopo | North-West | Western Cape | |
| Electricity | 310 | 271 | 1 429 | 756 | 214 | 97 | 210 | 242 | 750 | 4 279 |
| Paraffin | 49 | 25 | 34 | 52 | 14 | 18 | 17 | 34 | 48 | 291 |
| Wood | 397 | 223 | 380 | 296 | 104 | 33 | 120 | 264 | 132 | 1 949 |
| Coal | 509 | 58 | 18 | 490 | 156 | 34 | 621 | 148 | 44 | 2 078 |
| Gas | 11 | 40 | 87 | 43 | 108 | 7 | 23 | 25 | 7 | 351 |
| Total | 1 276 | 617 | 1 948 | 1 637 | 596 | 189 | 991 | 713 | 981 | 8 948 |

Suppose you can pick a household at random from the list of South African residences. What is the probability that the household

- 10.1 will be from Limpopo? (1)
- 10.2 will use electricity as a source of energy, given that the household is from the Western Cape? (3)
- 10.3 will be from the Western Cape, given that the household uses gas as a source of energy? (3)

[7]

Total: 150
