Tutorial Letter 101/3/2018

Psychological Research

PYC3704

Semesters 1 and 2

Department of Psychology

IMPORTANT INFORMATION:

This tutorial letter contains important information about your module. Please read it with care.

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- *Please note that formal tuition in this module will be conducted in English only. Where capacity exists, and upon request, individual discussions will be conducted in any preferred South African language.*
- ***Section 11** (Frequently Asked Questions) contains some advice on how to study for this course. Please read it.*
- *Some errors have unfortunately slipped into the Guide for PYC3704. Please attend to the corrections referred to in **Section 12** of this study letter (Errata) **before** you begin to work through the Guide for this module.*

1 INTRODUCTION AND WELCOME

Dear Student

Welcome to the course ***PYC3704: Psychological Research***. Right from the start we would like to stress that you should work through the **PYC3704 Guide** which you received with your study material with care**.** Do not use it like a reference book, just for looking up answers. It is organized to guide you through the material. Ideas and exercises are presented in a systematic way, and you will not follow the reasoning if you just read here and there. You must also read all the tutorial letters you receive during the semester **immediately and carefully**, as they always contain important information. You should also check *my*Unisa (see 1.2 below) for occasional announcements.

Students who do psychology (and social science in general) are sometimes surprised to discover that they are expected to do a course in quantitative research methods, which mainly consists of techniques based on statistics. Statistics are used by social scientists (and other scientists) to make decisions based on evidence that was carefully observed and expressed in quantified terms; that is to say, data based on measurements. You will learn how to organize information that was collected from samples of research participants and how one can make predictions based on characteristics of those data, so that it can be applied to new settings.

Exploring information based on measurement data is a skill that each social science researcher ought to possess. This module will show you some of the quantitative procedures that can be used in research, including how to set up hypotheses, make inferences, reach conclusions, and develop explanations for phenomena in psychology. These are processes that you need to understand even if your own interest lies elsewhere than in research as such. Even psychologists who specialise in psychotherapy have to know how to evaluate whether a treatment programme is actually working, and for this they must be able to read the scientific literature. The focus in the course will be on the reasoning processes that are involved in formal decision making, but some basic mathematics is required, since some abstract reasoning is involved.

1.1 Tutorial matter

Some of this tutorial matter may not be available when you register. Tutorial matter that is not available when you register will be posted to you as soon as possible, but will also be made available on myUnisa (see section 1.2 below)*.*

At the time of registration, you will receive an **inventory letter** that will tell you what you have received in your study package and also show items that are still outstanding. Also see the brochure entitled ***my Studies*** **@** ***Unisa***. Check the study material that you have received against the inventory letter. You should have received all the items listed in the inventory, unless there is a statement like “out of stock” or “not available”. If any item is missing, follow the instructions on the back of the inventory letter without delay.

The Department of Despatch of Unisa should supply you with the following **study material** for this module:

- ***My Studies*** **@** ***Unisa*** (general administrative information about Unisa)
- **Study Guide for Psychological Research** (only guide for module PYC3704)
- **Tutorial Letter 101/2018** (The tutorial letter you are looking at now). It contains administrative information and information about the assignments and the examination.

Study material in published form is forwarded to students by the Unisa Department of Despatch and not by the Psychology Department. Tutorial matter will be posted to you and also placed on *myUnisa* as soon as it becomes available. Tutorial letters with feedback on the assignments will be placed on *myUnisa* not long after the submission date for each assignment, so it will be possible to download it from there if you do not want to wait for the printed versions.

PLEASE NOTE: ***Your lecturers cannot help you with missing study material. Please contact the Unisa Department of Despatch*** *at* despatch@unisa.ac.za ***for enquiries about study material.*** **If your study material is late, you should try downloading it from *my*Unisa while you wait for the printed material.**

There is no prescribed book for this module (see Section 4 below).

1.2 *my*Unisa

The name **'***my*Unisa' refers to an Internet facility offered free of charge to all registered Unisa students. With the aid of *my*Unisa, students will ultimately be able to perform all study-related functions on the Internet which are now normally done by telephone, by letter or personal visits to the campus.

To make use of *my*Unisa, you will need a **computer** and an **internet connection**, as well as a **browser** such as *Internet Explorer*, *Firefox* or *Google Chrome.* See ***my Studies* @ *Unisa*** for further information.

You can use *my*Unisa to ---

- contact your lecturers via e-mail;
- join a discussion forum (e.g. to discuss your module with other students doing the same module);
- order books from the library, and search for books on the library database;
- download study material placed on *my*Unisa;
- interact with eTutors;
- check whether your assignments have been received and marked;
- submit written as well as multiple-choice assignments via *my*Unisa*;*
- look up your assignment or exam marks as soon as they are released.

To register on *my*Unisa, you should go to the Unisa web page, which is located at the Internet address *http://www.unisa.ac.za*.

*On this web page, select the option "my*Unisa*". If you are a first time user, you must click on the option "Register as my*Unisa *user" which will enable you to register online (this does not cost anything). Type in your name, student number and a password (the password must be at least 6 characters long). You will then be supplied with a PIN code (personal identity number) which you will use in all future transactions with my*Unisa*.*

Once you have registered, select the option "Enter *my*Unisa", which will take you into *my*Unisa. In *my*Unisa, select the option "My Courses", (in this case PYC3704). From here, you will be able to submit assignments and related activities (consult the publication ***my Studies* @ *Unisa***).

If you have problems when trying to use myUnisa, you can contact the myUnisa Help Desk at myUnisaHelp@unisa.ac.za, or SMS a note to 43582. This address is to be used only for *technical* (IT related) problems, not for problems related to the contents of the course.

Note also that students are automatically given a *myLife* email address where your student number is linked to '*@mylife.unisa.ac.za'*. Even if you prefer to use a different email address, you should link it to this address, or occasionally check this *myLife* address, since the university may send information there. It is the only email address that is linked to your registration details.

If you have problems with linking to this address, you can contact the MyLife help desk at myLifeHelp@unisa.ac.za.

2 PURPOSE OF AND OUTCOMES FOR THE MODULE

2.1 Purpose

The purpose of this course is to introduce you to the principles of quantitative research, which concerns the measurements of various qualities and using it to reach appropriate conclusions. You will learn more about the scientific reasoning process, where knowledge is acquired based on careful *observation* and the testing of *hypotheses*. You will learn about the principles of *inferential statistics*, which are techniques which can be used to test hypotheses, and which make use of *probabilities* to enable a researcher to reach appropriate conclusions about the *significance* of research findings.

This course is intended to develop your own scientific reasoning skills and it will eventually enable you to conceive of and develop your own research projects (which you will be required to do if you plan to do any post-graduate degree). Knowledge of the formal research process will also help you to read research articles and research referred to in books, skills which are necessary to anyone who wants to be able to understand and reflect on more advanced literature in psychology.

2.2 Outcomes

You will have acquired an introductory knowledge of some of the formal procedures and basic principles that govern research in psychology, particularly as it relates to quantitative research. You will have gained insight into the formal procedures for testing hypotheses: setting up the hypotheses, drawing samples, making measurements and using the principles of statistical inference to make conclusions about the validity of the hypotheses. You will have a basic understanding of the principles of inferential statistics, which represent techniques for making generalisations (inferences) based on data. You will be able to formulate hypotheses and test them, using appropriate statistical tests, specifically in cases where relationships between two variables at a time are being investigated.

3 LECTURERS AND CONTACT DETAILS

3.1 Lecturers

The lecturers for this module with their phone numbers and e-mail addresses are:

- Prof. Piet Kruger (012) 429-6235 *krugep@unisa.ac.za*
- Ms Helena Erasmus (012) 429-2823 *erasmhc@unisa.ac.za*
- Prof. Monika Dos Santos (012) 429-8577 *dsantmml@unisa.ac.za*
- Mr. Fana Simelane (012) 429-4438 *simelfz@unisa.ac.za*

Our module Administrative Coordinator, who deals with administrative matters related to this module, is:

- Ms Cornia Nel (012) 429-8233 *nelc1@unisa.ac.za*

3.2 Communication with the Department

3.2.1 *Communicating by letter*

Address all correspondence concerning problems experienced in studying a specific module, or arrangements for an appointment with a lecturer to:

The Department of Psychology
(Name of lecturer or module concerned)
P.O. Box 392
Unisa
0003

NOTE: You may enclose more than one letter to the *Psychology Department* in an envelope, but do not address enquiries to different departments (for example Despatch and Library Services) in the same letter. This will cause a delay in the replies to your enquiries. Write a separate letter to each department and mark each letter clearly for the attention of that department.

Letters to lecturers may not be enclosed together with assignments. It is important that you always write your ***student number*** *and the* ***study-unit or module code*** *at the top of your letter.*

3.2.2 *Communicating by telephone, e-mail or fax*

Names of the telephone numbers and e-mail addresses of your lecturers are given above (in Section 3.1). Note the following:

- Lecturers frequently have to attend meetings, conferences, discussion classes, *etcetera*. They may therefore not be in their offices at all times. If you cannot get hold of any particular lecturer in his or her office, phone the secretary Mrs Cornia Nel on (012) 429-8233.

- When you send an email, remember to indicate your ***student number*** and the ***module code***. Each of our lecturers is involved in different courses so you cannot assume they will immediately know which course your enquiry refers to.

- Our departmental fax number is (012) 429-3414. When you send a fax, remember to indicate the your ***student number***, the ***module code*** and the **lecturer's name**.

  Note that study material ***cannot*** *be faxed to students. Assignments should be submitted via* myUnisa *or submitted to the* Unisa Assignments Section *in the envelopes that are supplied,. Submissions by fax will* ***not*** *be accepted!*

You can also contact a lecturer via the *my*Unisa system. Proceed as follows:

- Register as a *my*Unisa user (see Section 1.2 above). Select "My Courses" and then the option "Contact Lecturer". This will enable you to send e-mail correspondence to the lecturers involved in this module (also consult the publication ***my Studies @ Unisa***). Do not forget to indicate your ***student number*** and the ***module code*** in your message.

3.2.3 Personal visit to the Department

Always make an appointment before coming to UNISA to see a lecturer. Lecturers often attend meetings or have other commitments which prevent them from seeing students without formal appointments. The physical address of the department for personal visits is:

Theo van Wijk Building
5th floor, Room 5-52
University of South Africa main campus
Preller Street
Muckleneuk Ridge
Pretoria

3.3 Contacting the University

Administrative enquiries should be addressed to the relevant administrative department. The Psychology Department deals only with issues related to the content of courses and modules in psychology. We do not deal with issues such as those related to registration, fees, course selections, despatching study material, receiving or posting assignments or formal arrangement related to exams.

Contact information for various types of enquiry is given in the table that follows.

Department /Directorate	Enquiries related to …	E-mail	Short SMS code
Students Admissions and Registrations	Applications and registrations	*Study-info@unisa.ac.za*	43578
Student Assessment Administration	Assignments and Examinations	*assign@unisa.ac.za or exams@unisa.ac.za*	43584
Despatch	Study material	*despatch@unisa.ac.za*	43579
Finance	Student accounts	*finan@unisa.ac.za*	43583
ICT	*my*Unisa *my*Life	*myUnisaHelp@unisa.ac.za* *myLifeHelp@unisa.ac.za*	43582

4 MODULE RELATED RESOURCES

4.1 Prescribed books

There are no prescribed books for this module. The only required material is the Unisa Study Guide for the module *PYC3704: Psychological Research*, which will be supplied to you with your study material but is also available on *myUnisa.*

4.2 Recommended books

The syllabus of this module is covered completely in the PYC3704 Study Guide and you need not buy or use additional books. However, it is always useful to read more widely to increase your comprehension of a specific topic. Additional reading may help you to get more insight or a different perspective, especially where you feel you need more detailed explanations of some aspects of the material.

Printed books

While any introductory book to social science statistics can be useful, we recommend the two books listed below. A number of copies of these books are available in the Unisa Library and can be ordered from them.

- Howell, David C. (2014). **Fundamental statistics for the behavioral sciences.** Belmont, Calif.: Thomson/Wadsworth, Edition: 8th ed. [*Other editions of this book can also be used*]
- Gravetter, Frederick J., & Wallnau, Larry B. 2015. **Statistics for the behavioral sciences** (10th ed.). Boston: Wadsworth Cengage Learning. [*Other editions of this book can also be used*]

- *Note that the books above are copyrighted by the respective publishers. Downloading them without paying would be regarded as a copyright violation. If you are unable to obtain the book you require from the Unisa library and do not want to buy it, please consider the open source electronic books below, which are excellent resources*.

Electronic books and resources

There is a good introductory handbook and reference manual for STATISTICS available on the internet at *http://onlinestatbook.com/2*. This is an open source book so you may download it free of charge. There are different formats available, i.e. pdf, eBook (e-pub) and an interactive version for iPads or Apple iMac computers. The sections you can look at are 1, 3 to 5, 7, 9 to 12, 17 and 19. Note that you will not be examined specifically on this book. It is only suggested as further reading in addition to the PYC3704 Guide.

Another open source statistics book can be downloaded from https://openstax.org/details/introductory-statistics (you can choose between a high or low resolution -.pdf file here).

The BookBoon website at http://bookboon.com/ also offers free academic books, including some on statistics, from an introductory to advance levels.

Additional online resources are available, such as the *Rice Virtual Lab in Statistics* which you will find at *http://onlinestatbook.com/rvls/.* A collection of resources which includes videos on various topics related to statistics can be found at *Euclid's Statistical Matrix* at this address: *http://www.pitt.edu/~super1/ResearchMethods/StatisticsMatrix.htm.*

There is a course on 'Teach yourself statistics' at http://stattrek.com/. It goes beyond the material you are expected to master in the module PYC3704 module but you may derive some insight by looking at the exercises.

If you feel that your arithmetic and knowledge of the rules of calculation are a bit rusty, look at Appendix E in the PYC3704 Guide. Both the recommended books have appendices which contain reviews of arithmetic and exercises for you to do (in most editions it would be Appendix A). There is also an open source book (pdf) with an introduction to arithmetic at *http://sccmath.files.wordpress.com/***.** Select the *Basic Arithmetic (MAT082) – Workbook Edition 2*. Lessons 1 to 8 and 12 are of relevance to this course.

4.3 Electronic Reserves (e-Reserves)

There are no specific e-Reserves reserved in the library related to this course.

5 STUDENT SUPPORT SERVICES FOR THE MODULE

Group discussions: There will be no group discussions or video conferences for this module.

Tutoring: To find out whether there are tutorial classes available in this subject, contact your nearest Unisa learning centre. You could also contact Mr. Khuze Skosana (skosagm@unisa.ac.za), who is the coordinator in the Psychology Department for face-to-face tutors (at various Learning Centres) or Ms. Nomvula Nemaxwi (nemaxnj@unisa.ac.za), who can advise you on the availability of eTutors.

Study Groups: You should consider joining study groups with other students in your area. Our subject secretary, Ms. Cornia Nel (nelc1@unisa.ac.za) may be able to help you to find students who live near you. Alternatively you can join discussion groups with other students; for example those facilitated by *myUnisa*.

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 an 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.

For further information on the various student support systems and services available at Unisa (e.g. student counselling, tutorial classes, language support), please consult the publication ***my Studies @ Unisa*** that you received with your study material. This brochure also contains important information, such as guidelines for time management, planning skills, and preparation for the examination. The brochure also contains A-Z guide of the most relevant study material.

We suggest you keep an eye on the *myUnisa* web page for PYC3704 because we will occasionally put announcements there of any changes or other matters, as information related to this module becomes available.

6 MODULE SPECIFIC STUDY PLAN

- **NOTE:** Use your ***my Studies @ Unisa*** brochure for general time management and planning skills.

The module runs over one semester (half a year). You should develop a study plan as soon as possible, otherwise you will not get through all the material. It should make provision for all your subjects, and also for unforeseen circumstances such as illness and work pressure, to enable you to work through the entire syllabus in good time.

What followings is an *example* of a study plan, which you should, of course, adapt to suit your own circumstances.

Task	Work Covered
Assignment 01 *Closing dates:* 16 March (1st semester) 13 August (2nd semester)	This assignment deals with topics 1, 2 and 3. Use the first three weeks after receiving your study material to work through Topics 1 – 3, including the exercises at the end of the topics. Then start working on Assignment 01, referring back to these topics as needed, aiming to finish it by the deadline.
Assignment 02 *Closing dates:* 20 April (1st semester) 17 September (2nd semester)	After handing in the first assignment you should immediately start working through Topics 4 – 6, using about a week for each topic. Then do Assignment 02, aiming to finish it by the deadline. This assigment contains items from all topics relating to general principles of statistical testing, but will focus especially on Topics 4, 5 and 6.
Revision	After submitting Assignment 02, you should begin with revision immediatelly. The questions at the end of the topics and the assignment questions for both assignments are similar to the questions you will receive in the exam, so you can use them as practice for the exam. First try to answer them without looking at the answers we provide. Try and *understand* the reasons provided for the correct answers. It is hopeless to try and blindly memorise all of the questions.

7 MODULE PRACTICAL WORK

There are no practical work, experimental work or formal exercise classes for this module except that which is provided in the assignments.

8 ASSESSMENT

You will find many exercises in the Study Guide which you must do at home. There are two assignments for each semester course. Each of the two assignments counts for 10% of the final mark. The average for your two assignments will make up your year mark, which will count for 20% of your final exam mark. It is compulsory that you hand in at least *one* of the assignments in time to get admission to the exam, *else you will be refused admission to the exam*. Note however that if you hand in only one of the two assignments you will get no marks for the other one (that is, it will contribute 0% to the year mark). So it is recommended that you regard both assignments as compulsory.

You should note that the two assignments for the first semester differ from those of the second semester. ***Make sure that you do the correct assignment depending on which semester you are***

in. The closing date for the assignments (for each semester) and their ***unique numbers*** are given in the table below. If you hand in the wrong assignment you will not be able to correct the error after the deadline for that particular assignment closes. Both assignments (for each semester) are included in this tutorial letter and you will receive feedback on the assignments (for your semester) later in the year, shortly after the closing date for submission, by post and on *myUnisa*.

The assignments are good practice for the exam, so you should try and work out the correct answers and give responses based on your understanding of the text. There is nothing wrong with discussing the problems with other students, but if you give responses without *understanding* why it is correct, you will not be prepared when you encounter similar problems in the exam. To just copy responses which you got from somewhere else is in any case a form of plagiarism.

8.1 Assessment plan

Assignments are seen as part of the learning material for this module. You are actively engaged in learning as you do the assignments, study the reading texts, consult other resources, and discuss the work with fellow students. Feedback to the assignments will be made available in study letters and will contain not only the answers to the questions, but also discussions on *why* the particular answers are appropriate. Read this with care as it is part of your study material. Note that these study letters will be made available on *my*Unisa immediately after the closing date of the particular assignment, so you can have a look at it even before it reaches you by post.

> **IMPORTANT**: ***Note that each student must submit his or her own individual assignment. It is unacceptable for students to submit identical assignments on the basis that they worked together. The assignments are designed to be practice for the exams and to help you to master the material in this course.***

Examination admission and marking policy: As explained above, you must hand in at least one of Assignment 01 or Assignment 02 for exam admission, and each of them counts **10%** towards your exam mark, to a total of **20%** of your final mark. The other **80%** comes from the exam. However, if a student fails the examination with less than **40%**, the year mark will *not* contribute towards the exam. You have to submit at least one of the assignments ***on time*** to gain admission to the exam, but if you submit only one of them you will get no marks for the other one.

Note that there are ***no further opportunities*** to gain examination admission. Also take note that because feedback containing answers to the problems in the assignment is made available directly after the closing date for the assignment (by post and via *my*Unisa), ***no extensions will be given for these assignments.*** If you submit the wrong assignment it must be corrected by the assignment deadline, else changes will not be accepted.

8.2 Due dates of assignments, assignment numbers and unique assignment numbers

Closing dates for the assignments are as follows:

Semester	Assignment	Unique Number	Closing date	Status
1	**01**	**863057**	**16 March**	**Compulsory** (**10%** of of exam mark)
	02	**772245**	**20 April**	**Compulsory** (**10%** of exam mark)
2	**01**	**720556**	**13 August**	**Compulsory** (**10%** of of exam mark))
	02	**767389**	**17 September**	**Compulsory** (**10%** of exam mark)

Do not forget to fill in your ***student number*** and other required information on your mark reading sheet. Make sure that you indicate the ***unique assignment numbers*** on your mark reading sheets before submitting them, as this is how the assignments are recognised by our computer system.
For detailed information and requirements regarding assignments, as well as instructions for the use of mark reading sheets, consult ***my Studies*** **@** ***Unisa***. You will receive two kinds of feedback on the assignments:

- A computer printout showing your answers, the correct answers, and the mark you obtained. This can also be viewed on myUnisa;
- A tutorial letter with feedback about the assignment, containing the correct answers and explanations. Compare your own answer with the explanations we provide as part of your revision. You can expect similar questions in the exam to those in the assignments.

The tutorial letters with feedback on the assignments containing the correct answers and explanations will be made available soon after their closing dates by post and via *my*Unisa (which is why we cannot give extensions for these assignments).

8.3 Submission of assignments

You may submit your assignments either by post (on mark reading sheets) or electronically via *myUnisa*. Assignments may **not** be submitted by fax or by e-mail. For detailed information and requirements as far as assignments are concerned, see the brochure ***my Studies*** **@** ***Unisa.*** All 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 addressed to the Unisa Assessment Administration at *assign@unisa.ac.za*. You should also be able to find the required information on *my*Unisa.

To submit an assignment **via *my*Unisa**:

- Go to *my*Unisa.
- Log in with your student number and password.
- Select the module.
- Click on assignments in the left-hand menu.
- Click on the assignment number you want to submit.
- Follow the instructions on the screen.

Assignments submitted **by post** should be addressed to:

The Registrar
PO Box 392
UNISA
0003

The following important guidelines should be kept in mind before you submit any one of your assignments:

- Always keep a copy of your assignment answers in case your assignment does not reach the University.
- Submit the ***original*** copy.
- Remember to use your correct *student number* and the correct *unique number*.
- Where an assignment involves the use of a MARK READING SHEET, read the section "INSTRUCTIONS FOR THE USE OF MARK READING SHEETS" in the publication ***my Studies*** **@** ***Unisa***.
- Students who do not have access to the internet must complete their assignments on a mark reading sheet provided with your study material.

Remember the following when you fill out multiple choice mark reading sheets:

- Use only an **HB pencil** and mark your answers **clearly** in the block as follows: [**—**]
- If you mark a block incorrectly, make sure that the mark is erased properly.
- Do **not** staple your mark reading sheet to any document.

8.4 Assignments applicable to each Semester

8.4.1 Assignments for Semester 1

ASSIGNMENT 01 for Semester 1

- *This is a **multiple choice** assignment. Choose the one alternative that best completes the statement or answers the question and fill in the appropriate number on the mark reading sheet.*
- *The assignment is **compulsory** in the **first semester** and will count **10%** of your exam mark. However, if you obtain less than 40% for the exam, this assignment will **not** contribute to your exam mark.*
- ***No extension** of the closing date can be given as the answers will be provided with feedback shortly after the closing date.*
- *Remember to put the correct **unique number** on the answer sheet if you submit the assignment by post.*

Semester 1 only	Closing date: 16 March	Unique number: 863057

Question 1

In psychological research, a construct may be considered as a(n) - - - - -.

1. measurement based on the careful observation of aspects of humans or human behaviour
2. observation of an aspect of humans or human behaviour which was operationalized in some way
3. hypothetical aspect of humans or human behaviour which we wish to investigate
4. explanation of empirical observations based on the measurement of certain variables

Question 2

Empirical knowledge is knowledge that is based on - - - - -.

1. careful reasoning
2. appropriate theories
3. the observation of events
4. published research

Question 3

In research, a measurement that stays the same and remains a certain size from case to case is called a - - - - -.

1. standard error
2. independent variable
3. constant
4. dependent variable

Question 4

In scientific research, the word theory refers to a(n) - - - - -.

1. reasonable guess or creative insight which seems to explain a phenomenon
2. method to make the constucts which are involved in a phenomenon visible through a process of operationalisation
3. investigation or procedure which is performed to determine the relationships among variables
4. explanation of why the observations that were made are as they are, or are related in the way that they are related

Question 5

In the process of psychological research, researchers try to - - - - -.

1. prove that a theory is true
2. account for theoretical assumptions
3. obtain empirical support for a theory
4. change hypotheses into theories

Question 6

An introductory class in statistics has a mixture of students studying for a BA degree and for a BSc degree. There are 9 males and 15 females who are BSc students, as well as 8 males and 12 females who are studying for a BA. If one student is selected at random from this class, what is the probability of it being a BA student?

1. 8/24
2. 20/24
3. 20/44
4. 14/44

Question 7

If a coin is flipped three times, the sample space of possible outcomes (presuming H stands for 'Heads' and T stands for 'Tails') is:

1. HHH; TTT; THT; HTH; HHT; TTH; HTH
2. HTT; THT; HTH; HHH; TTH; TTT
3. HHH; HHT; HTH; HTT; THH; THT; TTH; TTT
4. HHH; HTT; HTH; TTT; HTT; THH; HHT; THT

Question 8

Two pupils, one girl and one boy, will be chosen to go on a field trip from a class of 12 girls and 15 boys. What is the probability that Mary and her brother John (who happen to be in the same class) will both be selected if boys and girls are selected separately at random?

1. 0.0056
2. 0.15
3. 0.0741
4. 0.037

Question 9

A teacher is teaching a class about probabilities. She shows the learners a bowl which contains **3 Red** marbles, **5 Blue** marbles and **7 Yellow** marbles. One of the learners, Vusi, is asked by the teacher to select one marble out of the bowl at random and to hand it to her. She shows the class that Vusi chose a **Blue** marble and she demonstrates to the class how to calculate the probability of this outcome. While holding on to the first marble, she asks Vusi to select another marble in the same way. She now asks the class to calculate the probability that ***both*** the first ***and*** the second marble chosen by Vusi would happen to be ***Blue***.

Select the *best* estimate out of the options given below.

1. 0.1333
2. 0.1111
3. 0.6190
4. 0.0952

Questions 10 to 12 are based on the following research scenario:

A psychologist wants to study how aspects of motivation can influence people's productivity in their work. She reads an article that claims that an important aspect of motivation is locus of control, which distinguishes people who are driven by their own personal ambition from those who act by conforming to a social group. To test this idea, draws a sample of 100 workers from a number of companies in the information technology sector. She divides the workers into two groups, those with an internal locus of control and those with an external locus of control, based on an appropriate psychometric test. She then uses job evaluation forms to assess the actual work performance of the workers in the two groups.

Question 10

Which of the following gives the best expression of the hypothesis that the researcher wishes to test?

1. Motivation affects the productivity of workers.
2. Internal locus of control is related to high productivity.
3. The job performance of workers is influenced by locus of control.
4. Motivation of workers is influenced by locus of control.

Question 11

Given that research is an investigation of a relationship between (two or more) constructs, which of the following constructs have to be compared to do this research?

(a) job performance
(b) motivation
(c) locus of control
(d) job evaluation forms
(e) people who work in the information technology sector

1. (a) and (c)
2. (a) (b) and (e)
3. (a) (c) and (e)
4. (c) and (d)

Question 12

The dependent variable in the study is - - - - - and the independent variable is - - - - -.

1. job performance; locus of control
2. locus of control; motivation
3. job performance; productivity
4. locus of control; job performance

Question 13

A Type I Error occurs if - - - - -.

1. the null hypothesis is rejected even though it is true
2. the null hypothesis is accepted even though it is false
3. both the null hypothesis and the alternative hypothesis are rejected
4. the null hypothesis is rejected but the effect size is found not to be significant

Question 14

The z score corresponding to a raw score represents the number of - - - - - that the raw score differs from the mean of the raw score distribution.

1. points
2. standard deviations
3. percentiles
4. variances

Question 15

Which best describes the *frequency distribution* of the ages of students attending a particular class?

1. A graph of the ages of the students showing the number of students in each of a number of categories, arranged from young to old.
2. The total of all ages, divided by the number of students.
3. The standard deviation of ages, indicating the width of the age distribution.
4. A graph of the ages of the students showing the way that the data is distributed around the mean age of the students relative to the standard deviation.

Question 16

The lower we set the level of significance, the greater the probability of - - - - -.

1. rejecting the null hypothesis
2. a type II error
3. a type I error
4. accepting the alternative hypothesis

Question 17

The *sampling distribution of means* refers to the - - - - -.

1. normal distribution of a raw score distributed around the mean
2. distribution of the different possible values of the sample means together with their respective probabilities of occurrence
3. distribution of the values of the items in the population
4. distribution of the means of all possible samples of a particular size randomly selected from the same population

Question 18

During the interpretation of psychological measurements the normal distribution is often - - - - -.

1. adapted to fit the observed frequency distribution of scores
2. used as a theoretical model for interpreting the observed distribution of scores
3. used to calculate the relative frequency of observed scores
4. used to derive the mean and standard deviation of a sample

Question 19

The examination marks of statistics course yielded a normal distribution with a mean of 50 and a standard deviation of 10. Determine the probability that the score would be 60 or above, if you were to select the score of one student at random. Into which of the four intervals listed below would the probability fall?

1. 0 to 0.25
2. 0.26 to 0.50
3. 0.51 to 0.75
4. 0.76 to 1.00

Use the scenario below to answer Questions 20 to 25:

A researcher suspects that the addition of certain food supplements to the diet of elderly people will reduce the decline in cognitive functioning that comes about because of aging. She decides to test this using a neuropsychological test that measures the speed with which objects are identified (the Neuropsychological Perceptual Speed or NPS test). The tests measures the speed with which a person reacts to stimuli in milliseconds. It is known that the distribution of scores on this test is approximately normal and that a mean of $\mu=80$ and $\sigma=20$ was found in the population of persons older than 65.

To investigate her hypothesis, she obtains a random sample of n=100 persons older than 65. Each member of this sample is given a daily dose of supplements over a period of six months. At the end of this time, each person is tested on the NPS test and a mean of $\bar{x} = 76$ is found. The researcher plans to test the hypothesis at $\alpha = 0.05$.

Question 20

The appropriate research hypothesis suggested by the scenario above is as follows:

1. Cognitive functioning declines with age.
2. The cognitive functioning of elderly persons is related to their perceptual speed.
3. Cognitive functioning will be better for elderly persons who take the dietary supplement than for those who do not.
4. The perceptual speed of elderly persons who take the dietary supplement will differ from those who do not.

Question 21

The appropriate alternative hypothesis to be tested is - - - - -.

1. H_1: $\mu < 80$
2. H_1: $\mu > 76$
3. H_1: $\bar{x} < 80$
4. H_1: $\mu \neq 80$

Question 22

The mean of the sampling distribution of the mean is - - - - -.

1. 80
2. 76
3. 20
4. unknown

Question 23

The standard error is - - - - -.

1. 20
2. 2
3. 0.05
4. unknown

Question 24

With the information as given in the scenario, what would be the most appropriate statistical test to test the hypothesis?

1. A one sample t-test
2. A two sample t-test
3. A test of correlation r for relationship between variables
4. A one sample z-test

Question 25

The test statistic is calculated and, based on this, a computer program is used to determine that the two-tailed p-value = 0.055. What conclusion can be drawn?

1. The null hypothesis can be rejected, so the supplement improves cognitive functioning.
2. The null hypothesis cannot be rejected, so the supplement does not improve cognitive functioning.
3. The alternative hypothesis can be rejected, so the supplement does not improve cognitive functioning.
4. The null hypothesis can be rejected, so the supplement does not improve cognitive functioning.

Use the scenario below to answer Questions 26 to 28:

A selection panel for Research Psychology students is interested in the importance of numerical literacy for Research Psychologists. They want to determine whether there is a difference between the numerical literacy scores of Research Psychologists and the general population of Psychologists. The researchers hypothesized that Research Psychologists will have higher numerical literacy scores than Psychologists in general.

In a previous study the mean and standard deviation for Psychologists in general have been determined as 74 and of 5 on the Numerical Literacy Test (NLT). When a random sample of n = 49 Research Psychologists were tested on the NLT, a mean of 78 and a standard deviation of 10 was found.

Question 26

An alternative hypothesis for the above can be written as follows:

1. $H_1: \mu > 78$
2. $H_1: \mu > 74$
3. $H_1: \bar{x} > 74$
4. $H_1: \mu \neq \bar{x}$

Question 27

The researchers in the selection panel decide to use a z-test to test for statistical significance. Calculate this test statistic.

1. 39.2
2. 0.8
3. 2.8
4. 5.6

Question 28

Even though the result is found to be very significant, the researchers wonder what the practical value of the outcome may be, if the sample size is compensated for. They decide to also calculate the effect size. They find the effect size is - - - - -.

Use these ranges in the table below to answer the question:

Effect size range	Meaning
0 – 0.3	Small
0.4 – 0.6	Medium
0.7 – 0.9	Large
1.0 and greater	Very large

1. small
2. medium
3. large
4. very large

ASSIGNMENT 02 for Semester 1

- *This is a **multiple choice** assignment. Choose the one alternative that best completes the statement or answers the question and fill in the appropriate number on the mark reading sheet.*
- *The assignment is **compulsory** in the **first semester** and will count **10%** of your exam mark. However, if you obtain less than 40% for the exam, this assignment will **not** contribute to your exam mark.*
- ***No extension** of the closing date can be given as the answers will be provided with feedback shortly after the closing date.*
- *Remember to put the correct **unique number** on the answer sheet if you submit the assignment by post.*

Semester 1 only	Closing date: 20 April	Unique number: 772245

Question 1

A test statistic is calculated to - - - -.

1. determine whether or not we can accept that the null hypothesis is true.
2. determine how far the observed measurements deviate from what we may expect by chance
3. get a measurement by which we can calculate the level of significance
4. determine whether or not we can reject the alternative hypothesis

Question 2

The size of the level of significance depends on - - - - -.

1. a choice made by the researcher
2. conventional rules
3. the p-value under H_0
4. the value of the test statistic

Question 3

Two samples may be regarded as dependent when - - - - - -.

1. each measurement in one sample is correlated with a measurement in the other sample
2. they were drawn from the same population
3. there is a systematic relationship between the composition of one sample and the other
4. they are both totally random

Question 4

A researcher wants to test the efficacy of psychotherapy aimed at relieving anxiety. She applies a test which measures one's level of anxiety to 30 patients before their therapy begins, and again three months later. She predicts that the mean anxiety scores after therapy will be lower than before. Which description of the research design below is the most appropriate?

1. A two-sample groups design with independent groups
2. A two-sample groups design with dependent groups
3. A one-sample groups design
4. A design where the correlation between two variables is tested

Question 5

In which circumstances can the z test for comparing a sample mean with a known population mean NOT be used?

1. The relevant population parameters are available to a researcher.
2. The population standard deviation is unknown.
3. The sample is not normally distributed.
4. The sample standard deviation is unknown.

Base your answers to Questions 6 and 7 on the following scenario:

An educational psychologist believes that the performance of pupils in mathematics can be improved by teaching them to play chess. She tests this on two samples of children. She gives chess lessons to a treatment group of 20 pupils while a control group of 24 pupils are given their normal classes. The psychologist intends to test her hypothesis at a significance level of $\alpha = 0.05$.

Question 6

Which is the appropriate test statistic to be calculated when testing this hypothesis (as specified in Question 12)?

1. The t-statistic for the difference between the means of two independent samples
2. The t-statistic for the difference between the means of two dependent samples
3. The t-statistic for the mean difference score of a single sample
4. The r-statistic for the correlation between two variables

Question 7

When calculating the test statistic referred to above, the psychologist uses a computer program to calculate the p-value. The computer presents her with a two-sided p-value of $p = 0.054$. What can she conclude?

1. The outcome is significant, so she can conclude that the alternative hypothesis can be rejected and that learning to play chess does have a positive effect on the mathematics ability of the pupils.
2. The outcome is significant, so she can conclude that the null hypothesis can be rejected and that learning to play chess does have a positive effect on the mathematics ability of the pupils.
3. The outcome is not significant, so she can conclude that the null hypothesis cannot be rejected and that chess has no effect on the mathematics ability of the pupils.
4. The outcome is not significant, so she can conclude that the null hypothesis cannot be rejected and that chess has a negative effect on the mathematics ability of the pupils.

Question 8

Which of the following alternative hypotheses requires a one-tailed test of significance?

1. The distribution of test marks on a English Comprehension Test of boys differs significantly from the distribution of test marks for girls.
2. The correlation coefficient between test marks and examination marks deviates significantly from zero.
3. The mean verbal ability score of boys differs significantly from the mean verbal ability score for girls.
4. There is a negative correlation between examination marks and general anxiety scores of pupils writing their grade 12 (matric) exams.

Question 9

The higher the level of significance is set, the greater the probability of - - - - -.

1. not rejecting the null hypothesis
2. an error of Type II
3. an error of Type I
4. a result that is not significant

Question 10

Suppose you compare a group mean with a particular population mean by using a t-test, and you find that the t-test statistic calculated for your research results is zero. Which conclusion is appropriate?

1. The p-value will be extremely small.
2. The null hypothesis is likely to be true.
3. The alternative hypothesis is likely to be true.
4. The null hypothesis can probably be rejected.

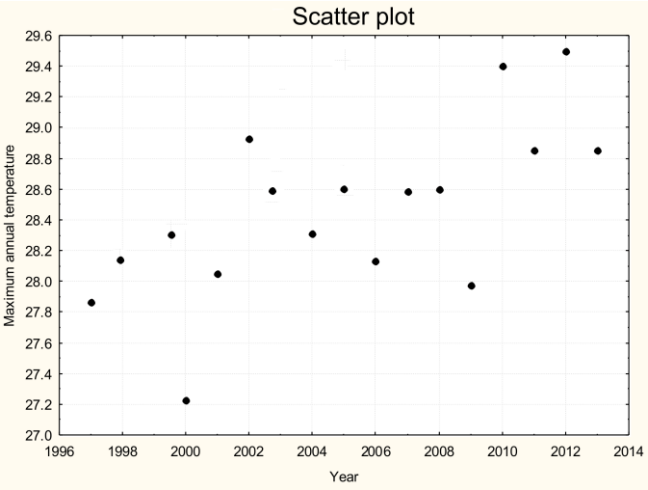
Question 11

A variable that can take only one of two possible values is called - - - - -.

1. binomial
2. dichotomous
3. nominal
4. categorical

Question 12

The graph below shows measurements of annual maximum temperature in a specific area in South Africa across a number of years in a study related to climate change.



Which of the following is the most likely Pearson product-moment correlation (r) between the variables?

1. – 0.3
2. 0
3. 0.5
4. 1.0

Question 13

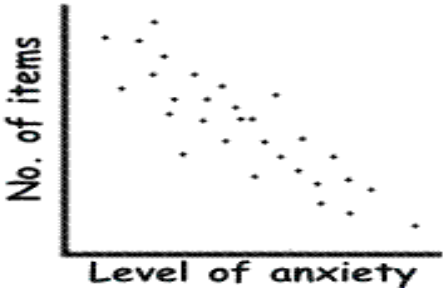
A contingency table is used to summarise the relationship between two variables measured on a(n) - - - - - scale.

1. nominal
2. ordinal
3. interval
4. ratio

Use the following scenario to answer Question 14 and 15

A researcher suspects that children's level of anxiety during a test will interfere with their memories. He gives a list of items to be memorized to a sample of children, and gives them a test to see how many items they can remember. Directly afterwards he also tests the level of anxiety of each child with an anxiety scale (where higher score shows a greater level of anxiety).

The researcher draws a scatter plot of the relationship between level of anxiety and number of items recalled. The result is presented below.



Question 14

What can the researcher infer about the relationship between *level of anxiety* and *number of items remembered* from the graph presented above? There is - - - - -.

1. a negative relationship: as anxiety rises less items are remembered
2. a positive relationship: as anxiety falls less items are remembered
3. a negative relationship: less items are remembered as anxiety falls
4. no actual relationship: the graph shows a negative trend over time

Question 15

Suppose the researcher uses the data to calculate the Pearson product-moment correlation (r) coefficient to determine the size of the relationship between *number of items remembered* and *level of anxiety*.

Which of following descriptions of the expected value of Pearson's r seems to be the most appropriate?

1. $r = 0$
2. $r > 0$
3. $r < 0$
4. $r \neq 0$

Question 16

When using a chi-square (χ^2) test, the null hypothesis is used to work out what the frequency distribution would look like if the null hypothesis were true. This ideal, hypothetical frequency distribution is compared with the actual distribution of frequencies found in the sample data. The 'ideal' frequencies (under the null hypothesis) are called - - - - - frequencies while the frequencies that are found is the sample data are called - - - - - frequencies.

1. expected; sample
2. observed; expected
3. theoretical observed
4. expected ; observed

Question 17

A researcher employed by the traffic department takes blood samples from 100 subjects who have been drinking variable amounts of alcohol. She then asks each of the participants to try and stand on one foot for as long as they possibly can. The blood alcohol level of the participants and length of time they can balance on one foot is then correlated. Which of the following results would you hypothesise as being the most likely outcome?

1. A positive correlation
2. A negative correlation
3. No correlation
4. A Pearson product moment correlation

Base your answers to Questions 18 to 23 on the following scenario:

An industrial psychologist runs a series of workshops which provided assertiveness training to middle managers at a particular company. She wants to determine whether the workshops are effective and she is also interested to know whether there is any relationship between **assertiveness** and **empathy**. She tests each participant before the workshops commence on a questionnaire that measures the level of assertiveness of each participant as well as on their score on a scale that measures empathy. After the training programme is completed, each participant is again tested for their level of assertiveness. The table below shows the results of the measurements.

Case no.	1	2	3	4	5	6	7	8	9	10	11	12
Empathy	5	3	3	3	1	5	2	1	2	4	2	4
Assert1	1	4	2	3	4	2	3	5	3	1	4	1
Assert2	3	5	3	5	5	3	5	4	5	4	5	4

Key: *Empathy* and *Assertiveness* were tested on 5-point scales (ranging from 1 equalling 'a small amount' to 5 equalling 'a large amount'). For Assertiveness, *Assert1* indicates the test result before the workshop, and *Assert2* is the test result thereafter.

Question 18

The researcher wants to determine whether the workshop is effective by comparing the measurements on the assertiveness test before the workshop with the measurements on this test after the workshop. Which of the following is an appropriate test statistic to calculate?

1. Pearson's correlation statistic (r)
2. The t_c test statistic
3. The t_d test statistic
4. The chi-square (χ^2) test for two variables

Question 19

The researcher calculates the value of the appropriate test statistic (in Question 18 above). In which of the four intervals below will the absolute value of the test statistic fall (i.e., ignoring a plus or minus sign)?

1. Between 0 to 1.0
2. Between 1.0 and 2.0
3. Between 2.0 and 3.0
4. Above 3.0

Question 20

The researcher finds that the test statistic calculated in Question 19 yields a p-value of p = 0.000572 (as calculated by a computer). What conclusion can be drawn from this? (Use α=0.01 as level of significance).

1. There is a significant improvement in the level of assertiveness as measured before and after the training
2. There is no significant improvement in the level of assertiveness as measured before and after the training
3. The probability value is too low, so the null hypothesis cannot be rejected with confidence
4. There is a significant difference in the level of assertiveness as measured before and after the training, in favour of the former

Question 21

The researcher is also interested to know whether the difference between the two assertiveness scores before and after the workshop is of practical significance; that is to say, irrespective of its statistical significance, whether the effect can be regarded as big or small. Calculate the relevant measurement of the size of the effect to answer the question below.

The size of the effect was found to be - - - - -.

1. small
2. medium
3. large
4. impossible to determine from this data

Question 22

The researcher is also interested to determine whether a relationship exists between *empathy* and *assertiveness* before the workshop commences. Which of the following is the most appropriate test statistic to use?

1. The chi square (χ^2) test statistic
2. The Pearson's correlation (r) test statistic
3. The t_c test statistic for independent variables
4. The t_d test statistic for dependent samples

Question 23

Which of the following is the result if this test statistic (in Question 22) is calculated? The value of the test statistic will fall - - - - -.

1. below - 0.4
2. between -0.4 and 0
3. between 0 and 0.4
4. above 0.4

Use the following scenario to answer Questions 24 and 25:

Lebo wonders whether a relationship exists between a person's length and their leadership ability. She collect data from a sample of 95 people, classifying them as short or tall, and as leaders, followers and those she could not classify. From this, she creates the table below.

Cross-classification	***Tall***	***Short***
Leader	*12*	*32*
Follower	*22*	*14*
Unclassifiable	*9*	*6*

Question 24

What is the kind of table that is given in the scenario above referred to?

1. A cross tabulation table
2. A frequency distribution
3. A correlation matrix
4. A contingency table

Question 25

What would you expect the number of people who can be classified as both 'Short' and as 'Leaders' to be under the null hypothesis?

1. Close to 10
2. Close to 52
3. Close to 16
4. Close to 24

8.4.2 Assignments for Semester 2

ASSIGNMENT 01 for Semester 2

- *This is a **multiple choice** assignment. Choose the one alternative that best completes the statement or answers the question and fill in the appropriate number on the mark reading sheet.*
- *The assignment is **compulsory** in the **second semester** and will count **10%** of your exam mark. However, if you obtain less than 40% for the exam, this assignment will **not** contribute to your exam mark.*
- ***No extension** of the closing date can be given as the answers will be provided with feedback shortly after the closing date.*
- *Remember to put the correct **unique number** on the answer sheet if you submit the assignment by post.*

Semester 2 only	**Closing date: 13 August**	**Unique number: 720556**

Question 1

Which of the following are advantages of studying statistical methods in psychology?

1. It leads to a better understanding of the content of psychological theories.
2. It helps us to formulate research questions.
3. It helps us to evaluate whether the patterns we observe in data are due to more than the consequence of chance.
4. It gives insight into the nature of the scientific process.

Question 2

Consider the following statement: "That phase of sleep during which brain rhythms resemble those of an alert person is called paradoxical sleep or rapid eye movement (REM) sleep". This statement is a - - - - .

1. conclusion based on empirical research
2. operational definition
3. research hypothesis
4. inference based on observation

Question 3

The purpose of research in psychology is - - - - -.

1. primarily to obtain more data
2. to describe and classify aspects of personality and human behaviour
3. to produce work of publishable quality
4. to extend the conceptual understanding of human behaviour by developing explanatory theories

Question 4

A psychologist studies the effect that age has on attitude towards Aids. She selects a sample of subjects divided into three different age groups, 20-30 years, 30-40 years and 40-50 years. The three age groups are - - - - -.

1. different variables for measuring ‘age’
2. operationalisations of the variable 'age'
3. three different theoretical constructs
4. a way of measuring ‘age’

Question 5

The term ‘inference’ in psychological research refers to - - - - -.

1. describing information in a precise way
2. making a prediction or generalization based on existing information
3. the procedures for making a construct visible so that a measurement can be made
4. the development of a hypothesis as a relationship among variables

Question 6

Consider the following statement: "The experience of strong emotion is accompanied by physiological reactions such as an increase in heart rate". This statement can be viewed as a research hypothesis because it - - - - -.

(a) makes a prediction that can be tested by observation
(b) describes a possible relationship between variables

1. (a) but not (b)
2. both (a) and (b)
3. (b) but not (a)
4. neither (a) nor (b)

Question 7

A psychologist uses a psychometric test to study the intelligence of school children. Intelligence is the - - - - - variable and the psychometric test measurement represents the - - - - - variable in this study.

1. independent; dependent
2. manifest; operational
3. dependent; independent
4. latent; manifest

Question 8

A - - - - - is a explanation of the relationship among - - - - -, based on empirical research, which has been tested and is taken to be true.

1. theory; constructs
2. hypothesis; variables
3. theory; statistics
4. hypothesis; constructs

Question 9

Quantitative methods refer to research were information is - - - - -.

1. expressed as numbers
2. based on observation
3. derived from statistical tests
4. presented in the form of descriptive statistics

Question 10

In which of the cases below should the two events or variables be described as dependent?

1. Tossing a coin and selecting a card from a deck of cards.
2. Drawing a marble from an bowl, throwing it away and then drawing a second marble.
3. Having a large IQ and having a large hat size.
4. Tossing a coin and then tossing a second coin.

Question 11

Random sampling is effective as it - - - - -.

(a) is guaranteed to represent all subgroups in the population in proportion to their size
(b) is free from personal biases
(c) gives a representation of the population which is reasonably accurate

Choose which stetements are valid from the list above.

1. (a) and (c)
2. only (c) is valid
3. (a) and (b)
4. (b) and (c)

Question 12

A meeting is held. There are three delegates who came from the north, two from the south, five from the west and three from the east. If one of the delegates is chosen at random to serve as chairperson of the meeting, what is the probability that the chairperson is from the south or the west?

1. 2/15
2. 5/13
3. 7/13
4. 11/13

Question 13

A coin is tossed and a die is rolled. Find the probability of getting a head on the coin and casing 4 on the die.

1. 0.083
2. 0.667
3. 0.250
4. 0.167

Question 14

What proportion of the normal distribution corresponds to z-score values greater than $z = 2.00$?

1. 0.0228
2. 0.4772
3. 0.50
4. 0.9772

Question 15

A standard normal distribution has a mean of - - - - - and a standard deviation of - - - - - and the probability of getting a standardized z-score of greater than 1 standard deviation is - - - - -.

1.	0	1	0.3413
2.	1	0	0.5
3.	0	1	0.1587
4.	1	0	0.3413

Question 16

In response to a questionnaire 57 people answered 'yes' to a particular question. Of these, 8 persons were male. There were 61 people that answered 'no' to the question, and 5 of these were male. If one person is selected randomly from the group, what is the probability that the person answered 'yes' ***or*** was male?

1. 0.14
2. 0.525
3. 0.593
4. 0.11

Question 17

Which best describes the probability distribution of the ages of students attending a particular class?

1. A graph of the ages of the students showing the number of students in each of a number of categories, arranged from young to old.
2. A graph of the proportion of students out of all students that fall in each of a number of categories, arranged from young to old.
3. The normal distribution of the ages of the students.
4. A graph of the ages of the students showing the way that the data is distributed around the mean age of the students relative to the standard deviation.

Question 18

The size of the p-value depends on - - - - -.

1. a choice made by the researcher
2. conventional rules
3. the null hypothesis
4. the value of the test statistic

Question 19

The examination marks of statistics course yielded a normal distribution with a mean of 62 and a standard deviation of 10. Determine the probability that the score would be 50 or below, if you were to select the score of one student at random. Into which of the four intervals listed below would the probability fall?

1. 0 to 0.25
2. 0.26 to 0.50
3. 0.51 to 0.75
4. 0.76 to 1.00

Question 20

When applying a statistical test, the probability of a type I error is equal to - - - - -.

1. 0.05 or 0.01
2. the level of significance
3. the calculated value of the test statistic
4. the p-value of the test statistic under the null hypothesis

Question 21

It is known that the population parameters of a specific measurement are $\mu = 50$ and $\sigma = 3$. A researcher draws a sample of n = 100 and finds that the sample mean on this measurement equals 59 while the sample standard deviation is 12. What z-value corresponds to this sample mean?

1. $z = 1.00$
2. $z = 3.00$
3. $z = – 3.00$
4. $z = 0.75$

Question 22

The central limit theorem makes it possible for statisticians to - - - - -.

1. calculate the sensitivity or power of a statistical test
2. calculate the probability of making an error of Type I for a statistical test
3. develop test statistics based on the statistical distribution of means
4. determine the p-value of any test statistic

Question 23

It is know that children in the general population have mean of 50 and a standard deviation of 10 on the Achenbach Child Behaviour Checklist. A sample of twenty children from a specific school is tested with this test. How will you formulate the relevant hypothesis to determine whether the sample of children differ from the population?

1. $H_0: \mu = 50$ $H_1: \mu > 50$
2. $H_0: \mu = 0$ $H_1: \mu \neq 50$
3. $H_0: \mu = 50$ $H_1: \mu \neq 50$
4. $H_0: \overline{x} = 50$ $H_1: \overline{x} \neq 50$

Question 24

When a null hypothesis should be rejected but is not rejected, this is referred to as an error of Type - - - - - and the probability of making this decision is indicated with the symbol - - - - -.

1. Type I α
2. Type II β
3. Type I β
4. Type II α

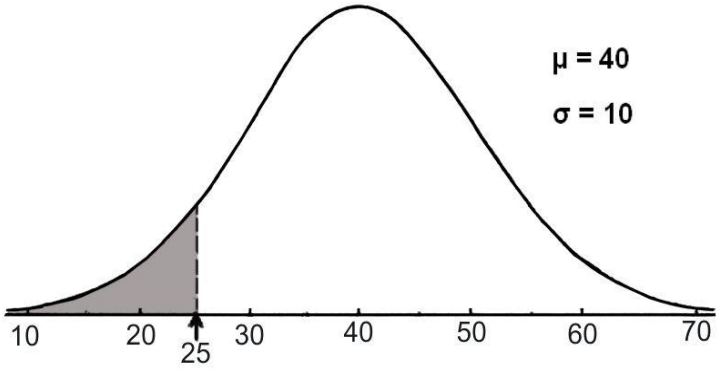
Question 25

The standard deviation of the distribution of sample means is called the - - - - -.

1. expected value of the sample means
2. standard error of the sample means
3. sample variance
4. central limit

Question 26

Look at the graph based on the frequency distribution of a measurement of a variable x from normally distributed data which is reproduced below. Using the information provided in the graph, calculate the probability that a measurement made at random on this particular scale will fall in the area under the curve coloured in grey.



Select the answer closest to the calculated probability from the options given below:

1. 0.010
2. 0.067
3. 0.159
4. 0.933

Question 27

Cohen's d is used to measure the - - - - -.

1. effect size
2. power of a test
3. probability of difference between two means
4. probability of rejecting H_0 based on a test statistic

Question 28

Which of the following samples would have the smallest standard error?

1. n = 25 scores from a population with σ = 10
2. n = 25 scores from a population with σ = 20
3. n = 100 scores from a population with σ = 10
4. n = 100 scores from a population with σ = 20

ASSIGNMENT 02 for Semester 2

- *This is a **multiple choice** assignment. Choose the one alternative that best completes the statement or answers the question and fill in the appropriate number on the mark reading sheet.*
- *The assignment is **compulsory** in the **second semester** and will count **10%** of your exam mark. However, if you obtain less than 40% for the exam, this assignment will **not** contribute to your exam mark.*
- ***No extension** of the closing date can be given as the answers will be provided with feedback shortly after the closing date.*
- *Remember to put the correct **unique number** on the answer sheet if you submit the assignment by post.*

Semester 2 only	Closing date: 17 September	Unique number: 767389

Base your answers to Questions 1 to 3 on the following scenario:

Sally, an educational psychologist, predicts that the mean IQ score of a group of 50 children in a special school for gifted children will be higher than the expected population average of 100.

Question 1

Indicate which *null hypothesis* Sally should specify from the options below:

1. H_0: $\overline{x} = 100$
2. H_0: $\mu = 0$
3. H_0: $\overline{x} > 100$
4. H_0: $\mu = 100$

Question 2

From reading the psychometric test manual, Sally knows that the IQ test was standardized on a mean of 100 and a standard deviation of 15. Which of the options below would be the most appropriate statistical test which she could use to test the hypotheses?

1. t_c
2. $z_{\overline{x}}$
3. $t_{\overline{x}}$
4. t_d

Question 3

Sally decides to perform her statistical test at a level of significance of $\alpha = 0.05$. Based on the data from the gifted children the computer calculates a test statistic and reports a two-tailed p-value of $p = 0.082$. What can Sally conclude with regard to the hypotheses?

1. She should reject H_0, and can conclude that the IQs of the gifted children is significantly higher than the population average
2. She cannot reject H_0 and so she cannot conclude that the IQs of the gifted children is significantly higher than the population average
3. She should reject H_1 and can therefore conclude that the IQs of the gifted children is not higher than the population average
4. She cannot make a conclusion because the exact value of the calculated test statistic is not provided

Question 4

When applying a statistical test, the probability of a Type I error is equal to - - - - -.

1. the level of significance
2. the p-value of the test statistic under the null hypothesis
3. the p-value of the test statistic under the alternative hypothesis
4. 0.05 or 0.01

Question 5

When comparing a sample mean with a specific value like an expected population mean, when should the one sample t-test be used?

1. s is unknown
2. σ is unknown
3. σ is known
4. s is known

Question 6

To test the efficacy of cognitive behaviour therapy aimed at relieving depression, a clinical psychologist applies a depression scale to a treatment group of 50 depressed patients at the end of their treatment, as well as to a control group of other patients who also suffer from depression but who did not undergo this specific form of therapy. She predicts that if the treatment was successful, the treatment group should display on average a lower degree of depression. Which research design is appropriate to test the research hypothesis?

1. A two-sample groups design with independent groups
2. A two-sample groups design with dependent groups
3. A one-sample groups design
4. A one-sample design with two variables being investigated for correlation

Question 7

What does it mean to say "the difference between the means of groups A and B is statistically significant"?

1. The null hypothesis adequately explains the results
2. The alternative hypothesis should be rejected
3. If the null hypothesis were true, the results found in the sample data would be unlikely
4. If the alternative hypothesis were true, the results found in the sample data would be unlikely

Question 8

When using a t-test to compare the means from two samples of data, a researcher finds a significant difference. She decides to also determine the effect size of the result. For what reason would she do this?

1. To double-check the result
2. To determine the power of the statistical test
3. To determine the probability of making an error if she rejects the null hypothesis
4. The see whether the statistical result is also reasonably meaningful in practical terms, irrespective of sample size

Question 9

The probability under the null hypothesis of obtaining a t-value of 2.5 or higher in the case of a one-tailed test is - - - - - that for a two-tailed test.

1. the same as
2. twice
3. half
4. unrelated to

Question 10

A researcher hypothesizes that the drug treatment of hospitalised schizophrenic patients improves their mental alertness. He studies a random sample of 27 patients to see whether there is a relationship between the number of days of drug treatment and patients' scores on the Mental Alertness Test.

Which is an appropriate null hypothesis for this research?

1. H_0: $r \neq 0$
2. H_0: $\mu = 0$
3. H_0: $r = 0$
4. H_0: $\rho = 0$

Question 11

Which of the following does **not** represent a valid value for Pearson's r?

1. -0.72
2. 0.00
3. -1.01
4. 1.00

Question 12

Which of the following alternative hypotheses requires a two-tailed test of significance?

1. The distribution of test marks on a English Comprehension Test of boys differs significantly from the distribution of test marks for girls
2. The correlation coefficient between test marks and examination marks is less than zero
3. The mean verbal ability score for boys is lower than the mean score for girls
4. There is a positive correlation between assignment marks and examination marks for undergraduate students in a psychology course

Question 13

Pearson's correlation coefficient r can vary from - - - - - to - - - - - and indicates a - - - - - relationship.

1. 0 1 linear
2. -1 1 significant
3. -1 1 linear
4. 0 1 significant

Question 14

The - - - - - of the correlation coefficient indicates the direction of the relationship, while the - - - - - indicates the strength of the relationship.

1. value; sign
2. linearity; magnitude
3. sign; value
4. size; slope

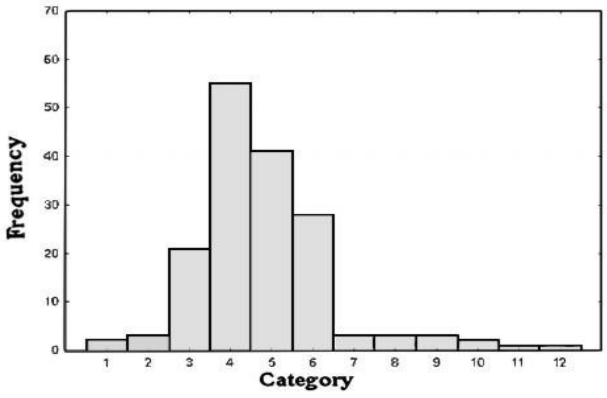
Question 15

A contingency table represents the - - - - -.

1. distribution of the data as measured by a variable for a sample
2. cross classification of frequency counts for two nominal-scale variables
3. plot of the relationship between two variables
4. probability distribution of outcomes of a random experiment

Question 16

The type of graph reproduced below is called a - - - - -?



1. scatterplot
2. histogram
3. normal curve
4. probability distribution

Question 17

The chi-square (χ^2) test statistic is used to compare the - - - - -.

1. distribution of observed frequency data with the way that the data should be distributed if the null hypothesis is true
2. variance or spread of observed data with the variance of the data as expected if the null hypothesis is true
3. way in which each of two variables vary (their variances) with the covariance (how they vary together) of both
4. extent to which the mean of a variable differs from the mean of another when both are nominal scale measurements

Base your answers to Questions 18 to 23 on the following scenario:

Alfred is a psychologist who is involved in a series of workshops which provide exercises designed to improve the self-esteem of the participants. Alfred wants to establish the effectiveness of the training programme, so he tests a group of 15 participants on a questionnaire which measures their self-esteem before the training commences and again after the training programme is completed. He also tests them on an anxiety scale before the workshop. The table below shows the results of these measurements.

***Key*:** *Case* is a unique number for each participant
Gender is coded with 1 = Male and 2 = Female.
Anxiety was measured on a 5-point scale (ranging from 1='little or no anxiety' to 5='high anxiety').
Self-esteem was measured on a 7-point scale (with 1='very low self-esteem' up to 7='very high self-esteem'). *SelfEst1* indicates the measurement before the training programme, while *SelfEst2* represents the measurement thereafter.

Case	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gender	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
Anxiety	1	3	2	4	3	3	5	1	3	4	4	3	3	2	4
SelfEst1	5	7	4	1	3	2	3	5	4	4	4	5	4	5	1
SelfEst2	6	7	6	2	3	3	3	4	5	4	5	5	6	5	3

Question 18

Alfred wants to determine whether there is a gender difference in self-esteem before the workshop. Select the most appropriate way for him to formulate his statistical hypotheses from the options below. (Note that subscrit 'M' refers to males and subscript 'F' refers to females in the symbols below).

1. H_0: $\mu_M = \mu_F$ and H_1: $\mu_M \neq \mu_F$
2. H_0: $\mu_M = \mu_F$ and H_1: $\mu_M > \mu_F$
3. H_0: $\overline{x}_M = \overline{x}_F$ and H_1: $\overline{x}_M \neq \overline{x}_F$
4. H_0: $\overline{x}_M = \overline{x}_F$ and H_1: $\overline{x}_M < \overline{x}_F$

Question 19

Which is the most appropriate test statistic for determining whether a difference exists *before* the workshop between *males* and *females* (in the '*gender'* variable)?

1. The t_d test for differences between dependent samples
2. The one sample t-test ($t_{\overline{x}}$)
3. The t_c test for differences between independent samples
4. The chi-square (χ^2) test for two variables.

Question 20

Alfred calculates the value of the appropriate test statistic (as selected in Question 19 above). In which of the four intervals below will the *absolute value* of the test statistic fall (i.e., ignoring a plus or minus sign)?

1. Between 0 to 1.0
2. Between 1.0 and 2.0
3. Between 2.0 and 3.0
4. Above 3.0

Question 21

Alfred is also interested to know whether the difference which was observed between the genders on the *self-esteem* scores before the workshop is of practical significance, irrespective of the size of the sample. In other words, he wants to establish whether the effect can be regarded as big or small, irrespective of its statistical significance. After calculating the relevant measurement of the size of the effect, Alfred finds that the effect is - - - - -.

1. small
2. medium
3. large
4. impossible to determine from this data

Question 22

Alfred is also interested to determine whether a relationship exists between *anxiety* and *self-esteem* before the workshop commences. Which of the following is the most appropriate test statistic to use?

1. The chi square (χ^2) test statistic
2. The t_c test statistic for independent variables
3. The t_d test statistic for dependent samples
4. The Pearson's correlation (r) test statistic

Question 23

Which of the following is the result if this test statistic (in Question 22) is calculated? The value of the test statistic will fall - - - - -.

1. below –0.4
2. between –0.4 and 0
3. between 0 and 0.4
4. above 0.4

Use the following scenario to answer Questions 24 and 25:

Lebo wonders whether a relationship exists between a person's length and their leadership ability. She collect data from a sample of 95 people, classifying them as short or tall, and as leaders, followers and those she could not classify. From this, she creates the table below.

Cross-classification	***Tall***	***Short***
Leader	*12*	*32*
Follower	*22*	*14*
Unclassifiable	*9*	*6*

Question 24

Which test should Lebo use to determine whether the relationship exists?

1. A t-test for independent samples to compare tall and short persons
2. A test based on the correlation coefficient of the relationship between 'length' and 'leadership ability'
3. A chi-square (χ^2) test
4. A t-test for dependent samples because the data all comes from a single sample.

Question 25

What would you expect the number of people who can be classified as both 'Tall' and as 'Followers' to be under the null hypothesis?

1. Close to 43
2. Close to 22
3. Close to 16
4. Close to 10

9 EXAMINATIONS

Use your ***my Studies*** @ ***Unisa*** brochure for general examination guidelines and examination preparation guidelines. Also read the text in Section 8.1 (Assessment Plan).

9.1 Examination Paper

The examination paper in **PYC3704: Psychological Research** will consist of 70 multiple choice questions which must be answered within 2 hours. Questions will be similar to those you have to complete in the assignments.

- *Y*ou must indicate the most correct one of the alternative answers provided to each multiple choice question on a mark answer sheet.
- You will, of course, not be given the same questions as the assignments or the Guide, but 70 different ones. The questions in the exam will however be similar to at the questions at the end of each topic and in the assignments.
- You can earn a maximum of 70 marks in the examination paper – one for each correct answer.
- Your mark is converted to a mark out of 80. The remaining 20% comes from your year mark (10% each from Assignments 01 and 02). Note however that if you obtain 40% or less in the exam, the 20% from the year mark will ***not*** be added.
- To gain admission to the exam, you have to submit at least one of the assignments ***on time***.

- In order to pass the exam, you must obtain an overall mark of 50% or higher. A mark of 75% and higher is a distinction.

- You must obtain at least 40% to be permitted to write a supplementary exam.

There are only two examination sessions per year in the semester system, in May/June 2017 or October/November 2018. If you fail the module, but achieve a mark of 40% or higher, you are entitled to one supplementary examination. This will take place during the next examination session at the end of the next semester. *You will be expected to inform the Assessment Administration Section of your intention to write the supplementary examination. You will also be expected to pay the examination fees*. Note that there will be **no** further supplementary exams. You cannot get an additional concession after a supplementary exam. If you fail the supplementary examination, you will be required to re-register for the module. The exam will be similar to the assignments for this year and the practice items in the Guide and study letters. A later Study Letter will give more details on format of the exam.

The examination paper will be in English only.

Old exam papers. Old exam questionnaires are made available by the Exams department on *myUnisa* but they do not form part of this year's study material. We do not make answers to old questions available. We do not have complete records of old questions and do not have answers and worked-out feedback (what was asked, when, and why). We cannot go through it question by question. Note also that some of the questions in old papers may refer to material in previous editions of the PYC3704 Guide.

9.2 Examination period

PYC3704 is a semester module. This means that you will write the examination in May/June 2018 or October/November 2018. More specific details about the format of the exam paper will be provided in a tutorial letter which will be made available later in the semester. You can expect it to be posted and downloaded on *my*Unisa during the semester.

The Examination Section will provide you with information regarding administrative details related to the examination, such as examination venues, examination dates, examination times, supplementary and special examinations (due to illness or accident). Please make sure that you have these details.

If you do not know your examination date or venue, please contact the Unisa Assessment Administration at *exams@unisa.ac.za.*

Your lecturers will unfortunately not be able to help you with this.

10 OTHER ASSESSMENT METHODS

There are no other assessment methods for this module.

11 FREQUENTLY ASKED QUESTIONS

The brochure ***my Studies @ Unisa*** contains an A-Z guide of the most relevant study information. This includes guidelines for time management, planning skills, the examination and preparation for the examination.

Here are some general suggestions on how to cope with this course.

- Work your way systematically through the PYC3704 Study Guide. Try to *understand* the text, do not think you can memorise it. The Guide is written with the idea that you begin at the beginning and work systematically through the text. We know students are tempted to rush to the assignments and then to search in the Guide for the answers, but you will find it difficult or impossible to master this material if you do not stop to look at the *reasoning behind* the answers. Your *insight* will be tested in the assignments and the exam and you can only acquire that by working through the text. Statistics is a skill, like dancing or riding a bicycle. You learn by doing the exercises and solving the problems, not reading about it or watching other people such as a tutor.

- Do all the questions at the end of each topic. Try to answer them first without looking up the answers. Do not mark the answers in the Guide, but on a separate sheet of paper, so you can test your knowledge later. When you do look at the answers we provide, try to understand the reasoning behind the correct choice.

- Do BOTH of the assignments and send them in so that we can mark them. The correct answers and explanations of why they are correct will be provided later in a tutorial letter after the assignment deadline (by post and put on *myUnisa*), but it is important that you first try to figure out the correct answers on your own. As is the case with the question at the end of the topics, it is best NOT to mark the correct answers inside your 101 or feedback tutorial letters. Keep a record of your own and the correct answers (which we provide) on a separate sheet of paper. In this way you will see which questions you can answer, and which ones you cannot answer. This will help you identify the difficult questions, and force you to rethink the reasons for the answers.

- When you prepare for the exam, after studying the relevant topic, you should work through all the questions: the ones at the end of the topics and the assignment questions. First try to answer them without looking at the answer we provide (which is why you should not mark the correct answers in the study guides). Try and *understand* the reasons provided for the correct answers. It is hopeless to try and blindly memorise all of the questions (which is why we do not supply answers to old examination questionnaires).

- If you really do not understand the information in the PYC3704 Guide, or the explanations given for the correct answers, make a note of the particular questions and concepts that you feel that you do not understand. You can then contact your lecturers to help you with this. It is much easier to help you if we know which particular concepts or questions give you difficulties.

12 ERRATA

Unfortunately a few errors have been found in the PYC3704 Guide which could not be corrected in time for printing. Where it is necessary, the text in the Guide should be ***replaced*** *with the information given below.*

Please correct it NOW!

- *Page 25, in the answer to Question 23:*

23. Option 2 is correct (see section 1.3.2). Option 1 is incorrect because variables can both be qualitative (in that they represents some quality) or quantitative, while the distinction 'qualitative' or 'quantitative' is difficult to make in the case of constructs. Option 3 is incorrect because a construct is an abstract theoretical entity and not a constant (i.e. a numerical value that is constant).

- *Pages 25-6, discussion of question 24 (last question on the page):*

24. Option 2 is correct. In the study the psychologist proposes that `anxiety' has an effect on `exam performance'. `Anxiety' is, therefore, the independent variable, and `exam performance' is the variable that is actually being measured, the dependent variable. Option 1 is incorrect because exam performance is a manifest and not a latent variable.

- *Page 35, third paragraph (the error is in the sentence beginning with "Therefore …"):*

For example, what is the probability of drawing either an ace or a heart from a well-shuffled, standard deck of 52 cards? First note that p(ace) = 4/52 = 1/13 and p(heart) = 13/52 = 1/4. However, we cannot just add these probabilities together because 1 of the 13 hearts is the ace of hearts. Therefore, adding 1/13 and 1/4 together will result in one of the cards being counted twice (first as one of the aces, and then as one of the hearts).

- *Page 36, second to last paragraph:*

Let us assume that we know that the chance of Marie winning the race and also a trophy is 0.3. We also know that the probability of winning the race is 0.5. What is the conditional probability of her winning a trophy provided she had won the race?

- *Page 37, second to last paragraph above the Example:*

The fact that a number that was drawn in the Lotto cannot be drawn again affects the probability of the next number to appear in the sequence of numbers.

- *Page 55, calculations:*

For IQ: $z_1 = \frac{120-100}{15} = \frac{20}{15} = \frac{4}{3} = 1.333$ For mathematical aptitude: $z_2 = \frac{8-5}{1.5} = \frac{3}{1.5} = 2.000$

- *Page 112, fourth paragraph:*

An implication of this is that independent samples do not have to be the same size (but they can be), while dependent samples *have* to be of the same size, as each individual measurement from one sample should be matched to an individual in the other sample.

- *Page 116, second paragraph:*

We used a computer program to compute the directional p-value associated with this value of t_c = 4.46 and found a probability of p-value = 0.00007. This p-value is clearly smaller than the level of significance which we set at α = 0.01.

- *Page 125, question 10: (The symbol for level of significance should be* **α** *and not* **a***).*

If α is set to 0.10, what is the decision regarding H_0?

- *Page 172, second paragraph: (the horizontal lines which were printed should be removed)*

$\sqrt{b}$	The square root of **b**. The number that must be multiplied by itself to produce **b**. Example: $\sqrt{\mathbf{144}} = \mathbf{12}$**.** Note that $\sqrt{b} = b^{1/2}$ and that you can never get a square root of a negative number: $\sqrt{-c}$ is invalid.

We hope you enjoy your studies and that you find this course rewarding.

The PYC3704 teaching team