



Tutorial letter 101/3/2018

**Measurement in Intermediate and Senior
Mathematics**

MAE103L

Semesters 1 & 2

Department of Mathematics Education

IMPORTANT INFORMATION:

This tutorial letter contains important information
about your module.

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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 OF AND OUTCOMES FOR THE MODULE

2.1 Purpose

The purpose of this module is to

Develop your ideas about measurement and familiarise you with different views of how a learner's concept of measurement can be developed.

2.2 Outcomes

After working through this module, you should be able to

- Use appropriate measuring units, instruments and formulae in a variety of contexts
- Explain how measurement developed historically.
- Discuss measurement concepts and how to develop these concepts in the intermediate and senior phase.
- Work with the measurement of length, perimeter, area, volume, capacity, surface area, mass, temperature, time and angles.
- Use instruments to measure the different attributes.

- Explain how each of these attributes can be taught.
- Use formulas to calculate the perimeter and area of a 2-D figure and the volume and surface area of a 3-D object.

3 LECTURER(S) AND CONTACT DETAILS

3.1 Lecturer(s)

Lecturer's name:	Dr. S W Makgakga
Building and office number:	AJH Building 7-58
E-mail address:	makgasw@unisa.ac.za
Telephone number:	012 429 4293

3.2 Department

All queries that are not of a purely administrative nature **but** are **about the content of this module** should be directed to us. Please have your study material with you when you contact us. E-mail and telephone numbers are included above but you might also want to write to us. Letters should be sent to:

The module leader (MAE103L)
 Department of Mathematics Education
 PO 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 MODULE-RELATED RESOURCES

4.1 Prescribed books

Your prescribed textbook for this module for this year is:

Van de Walle. JA.2016.*Elementary and middle school mathematics: teaching developmentally*. 9thedition. New York: Pearson Education.

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.

This book will be used for all of the modules of this course. It is written in a user-friendly style and uses an interactive approach. It is an American textbook but, in our opinion, it deals more comprehensively with the outcomes and assessment criteria of the Mathematics learning area than many of the South African books currently available. The textbook is based on the problem-solving approach, which allows you to teach Mathematics in a real-world context and fits in with the ethos of CAPS.

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 mathematics 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>.

4.4 Library services and resources information

For brief information go to: <http://www.unisa.ac.za/contents/studies/docs/myStudies-at-Unisa2018-brochure.pdf> (**2018 address to be placed here)

For more detailed information, go to the Unisa website: <http://www.unisa.ac.za/>, click on Library

For research support and services of Personal Librarians, go to: <http://www.unisa.ac.za/Default.asp?Cmd=ViewContent&ContentID=7102>

The Library has compiled numerous library guides:

- find recommended reading in the print collection and e-reserves - <http://libguides.unisa.ac.za/request/undergrad>
- request 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/find 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.
6

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 CST1501. 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 THE MODULE

Free computer and internet access

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

For information on the various student support systems and services available at Unisa (e.g. student counselling, 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:

- Tutorial Letter MAEL/01 for more detailed information
- <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 MODULE-SPECIFIC STUDY PLAN

Use you're Study @ Unisa brochure for general time management and planning skills.

7 MODULE PRACTICAL WORK AND WORK-INTEGRATED LEARNING

This module will assist you in the planning of your relevant teaching practice lessons on mathematics in intermediate and senior phases.

8 ASSESSMENT

8.1 Assessment criteria

The marking of the assignments is based on your understanding of

- Distance, time, area and perimeter
- Circumference and area of circular shapes
- Ability to give examples that enable learners to like and understand mathematics
- What it means to measure something, as discussed in units 1 and 2 of the study guide
- Measurement in general and your ability to answer specific questions involving measurement
- The connectedness between measurement and other topics in mathematics
- The concepts of length, perimeter and area by making sketches and doing calculations
- The concepts of surface area, volume, mass and weight, as covered in study unit 3 of the study guide, and your ability to explain and apply it.
- Mistakes in calculations 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 more clearly what is required of you.

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. There are two assignments per semester. Assignment 01 contributes 20% and assignment 2 contributes 80% to the year mark. See table below.

Assignment	Type	Marks	Marks (%)	Contribution to year mark (%)
01	Multiple Choice	10	100	20
02	Written	100	100	80

Year mark

The year mark contributes **20%** of the final mark. It is composed of the marks obtained in each assignment.

Although each assignment is converted to a percentage, this mark will be converted to a mark out of 4 for assignment 01 and out of 16 for assignment 02. By handing in assignments, you can work towards a substantial year mark. The exam mark, however, carries the most weight.

Assignment	Type	Marks (%)	Weight (%)	Assignment Mark	Contribution to final mark (%)	
01	Multiple Choice	100	20	20	20	4
02	Written	100	80	80	20	16

Exam mark

The exam mark contributes **80%** of the final mark.

The mark that is obtained in the final examination will be converted to a mark out of 80.

Final mark

The final mark consists out of the year mark (20%), plus the exam mark (80%). In order to pass this course, you must obtain a final mark of at least 50%.

The summary of year mark and the examination mark is as follows:

Assignment 01 (A1)	4%
Assignment 02 (A2)	16%
Total Assignment Mark (year/semester mark) = A1 + A2 (YM)	20%
Examination mark (EM)	80%
Final Mark = EM + YM	100%

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.

8.3 General assignment numbers

Assignments are numbered consecutively per module, starting from 01.

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 the 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 Assignment Section

PO Box 392

UNISA

0003

You will automatically receive the correct answers 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. The tutorial letter numbers will be 201, 202, et cetera.

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.

The feedback on the self-assessment assignment is included in this tutorial letter.

This will enable you to mark your assignment as soon as you have completed it. Feedback on myUnisa additional assessments will be automated and therefore immediate.

Additional work set by tutors will be discussed in class.

8.3.1 Unique assignment numbers

First semester:

Assignment	Unique number
01	893271
02	781459

Second semester

Assignment	Unique number
01	828425
02	724699

8.3.2 Due dates for assignments

First Semester:

Assignment	Date
01	26 February 2018
02	26 March 2018

Second semester

Assignment	Date
01	13 August 2018
02	10 September 2018

8.4 Submission of assignments

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.

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 Assignment 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 e-mail. 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 number of the assignment 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

8.5 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.

9 OTHER ASSESSMENT METHODS

None

10 EXAMINATION

DEMARCATATION 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.

10.1 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.

10.2 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.

10.3 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.

10.4 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.

11 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.

12 SOURCES CONSULTED

None

13 CONCLUSION

I wish you every success in your studies.

14 ADDENDUM

14.1 Addendum A: Semester 1 assignments

Assignment 01 is compulsory for examination admission

Due date 26 February 2018

Remember

Make sure you fill in the following information in the space provided on the mark-reading sheet.

- **Student number:**
- **Module code: MAE103L**
- **Unique number: : 893271**
- **Assignment number: 01**

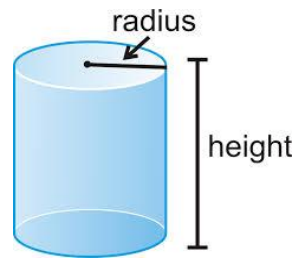
1 Choose the correct conversion:

Barometer is an instrument used for:

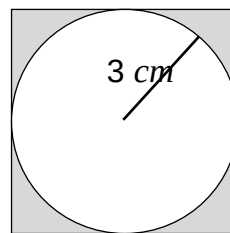
- 1 Heat
- 2 Mass
- 3 Air pressure
- 4 Volume

- 2 How many tiles whose length and breadth are 13 cm and 7 cm respectively are needed to cover a rectangular region whose length and breadth are 520 cm and 140 cm?
- 1 600 tiles
 - 2 750 tiles
 - 3 800 tiles
 - 4 1000 tiles
- 3 One morning, the temperature was 10° below zero. By noon, the temperature rose 20° and then dropped 8° by evening. What was the evening temperature?
- 1 18° below zero
 - 2 10° above zero
 - 3 2° below zero
 - 4 2° above zero
- 4 A car has two wipers, which do not overlap. Each wiper has a blade of 35 cm sweeping an angle of 120° . Find the total area of each sweep of the blades.
- 1 $641,4 \text{ cm}^2$
 - 2 $11545,4 \text{ cm}^2$
 - 3 $23090,7 \text{ cm}^2$
 - 4 $1282,8 \text{ cm}^2$
- 5 The SI unit for measuring length is:
- 1 millimetre
 - 2 centimetre
 - 3 kilometre
 - 4 metre

- 6 The sum of the height (h) of a cylinder and the circumference of its base is 10 metres. Let r be the radius of the cylinder's base. Determine the volume of the cylinder in terms of r .



- 1 $V(r) = 5\pi r^3 - 2\pi^2 r^2$
 - 2 $V(r) = 10\pi r^2 - 2\pi^2 r^3$
 - 3 $V(r) = 10\pi r^2 - 2\pi^2 r^2$
 - 4 $V(r) = 15\pi r^2 - 2\pi^2 r^3$
- 7 Calculate the area of the shaded part.



- 1 $6(4 - \pi) \text{ cm}^2$
 - 2 $9(\pi - 1) \text{ cm}^2$
 - 3 $6(6 - \pi) \text{ cm}^2$
 - 4 $9(4 - \pi) \text{ cm}^2$
- 8 The volume of a cube is 125 m^3 . The length of the edge is
- 1 25 cm
 - 2 15 cm
 - 3 5 cm
 - 4 10 cm
- 9 A ladder is placed against a wall of a building. The foot of the ladder is 3 m from the wall and reached the height of 4 m against the wall. Calculate the length of the ladder.
- 1 12 m
 - 2 7 m

3 5 m

4 9 m

10 If my dog has a weight of 49N on the earth, how will his weight on the moon compare?

- 1 His weight will be less
- 2 His weight will be more
- 3 His weight will be the same
- 4 It depends how far the moon is from the earth

TOTAL: 10

ASSIGNMENT 02

Unique number: **781459**

Due date: **26 March 2018**

NOTE

- This assignment covers the material in Tutorial Letter 501 and chapter 19 in the prescribed book. You will also have to do some reading or research for question 1, which tests your general knowledge on measurement.
- Answer all the questions.

Question 1

This question consists of twenty short questions over a wide range of measurement. The purpose of this question is to broaden your knowledge of measurement. You might need to do some research.

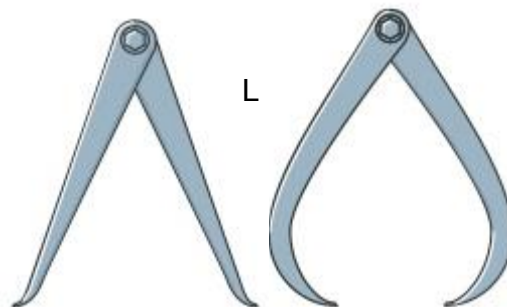
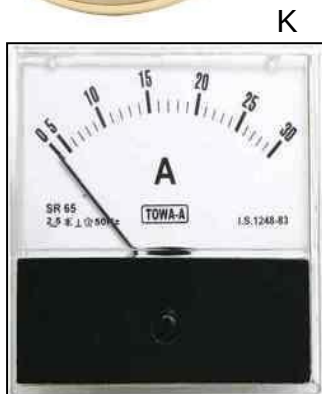
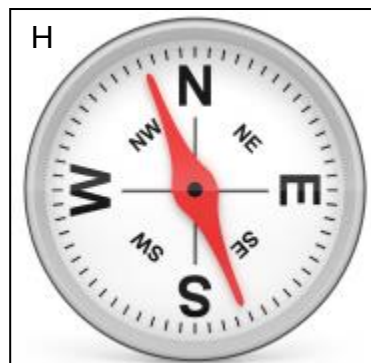
1.1 What is a cubit, and what does it measure?

1.2 What do you think of when you see the names Celsius and Fahrenheit?

- 1.3 What does SI stand for in measurement?
- 1.4 What did the Babylonians use to measure time?
- 1.5 One *inch* = ... *cm*. Give your answer correct to two decimals.
- 1.6 What is the tare of a truck?
- 1.7 What is solstice and equinox?
- 1.8 What is a hectare? Discuss.
- 1.9 How many cubic centimetres are there in a litre?
- 1.10 What is the normal body temperature of a human body?
- 1.11 What is a trundle wheel? What is it used for?
- 1.12 Convert 200m/sec to km/h
- 1.13 Why do we have leap years?
- 1.14 Which month is named after Julius Caesar?
- 1.15 What is a nautical mile?
- 1.16 What is measured in carats?
- 1.17 How is body mass index calculated?
- 1.18 Why is our calendar called the Gregorian calendar?
- 1.19 How many seconds are there in a day?
- 1.20 How is body mass index calculated? [40]

Question 2

In the pictures below, identify the instrument, and state what it is used for.



[24]

Question 3

- 3.1 What do you understand about Piaget's *conservation of length* concept? Describe two activities that can be given to young learners to determine whether they have achieved this concept. (6)
- 3.2 It is the task of the teacher to introduce concepts of measurement in a practical way to Intermediate Phase learners. Using the attribute of **volume**, give three examples of practical ways in which the teacher can introduce this concept. (6)
- 3.3 Discuss the role of estimation in the development of measurement concepts. (4)
- 3.4 What is the difference between mass and weight? (2)
- 3.5 Convert the following:
- 3.5.1 One kilogram = _____ gram. (1)
- 3.5.2 One square kilometre = _____ square centimetre. (1)
- 3.5.4 Ten millilitre = _____ kilolitre. (1)

[21]

Question 4

- 4.1 Explain how the formula for the perimeter of a rectangle and square can be introduced. Use drawings to illustrate your answer. (6)
- 4.2 The surface area of a cube is 24cm^2 . Calculate the length of the sides of the cube. (5)
- 4.3 Draw up an activity that will enable learners to develop a formula for calculating the area of a trapezium. (7)
- 4.4 Calculate the area of a trapezium which has parallel sides of 10cm and 6cm respectively and perpendicular distance of 7cm between the parallel sides. (5)

[23]

Question 5

Suppose you are a learner in Ms Zoid's mathematics class. In one lesson, she said she was going to teach the learners about volume. You never really understood what volume is, but you participate in all the activities. She puts the learners into groups, and gives each group 36 small cubes. She asked the learners to build as many different prisms they can, using any amount of cubes.

5.1 Draw five different sized rectangular prisms that you could have built in the classroom as a learner. (Show the drawings) (5)

5.2 Reflect on this lesson as a student who is going to teach Mathematics one day.

5.2.1 What questions could the teacher have asked to help you understand what volume is? List at least three. (3)

5.2.2 Draw up a worksheet with activities that the teacher could have given her learners. (5)

[13]

Question 6

6.1 How would you measure the volume of an irregular object such as a stone? (4)

6.2 A cylinder with the height of $2x$ units is placed inside a sphere with radius $5\sqrt{3}$ units. O is the centre of the sphere.

6.2.1 Show that the volume of the cylinder can be expressed as $V = 150\pi x - 2\pi x^3$. (6)

6.2.2 Calculate the volume of the cylinder if its radius is 5cm. (4)

6.3 Temperature can be measured in a variety of units. What are the two most popular units in which temperature is measured in the world today? (Give the correct names and not just the abbreviations) (2)

6.4 On a hot summer day in South Africa, it is 30°C . What is the temperature in $^\circ\text{F}$? Use the formula: $F = \frac{9}{5}C + 32$ (3)

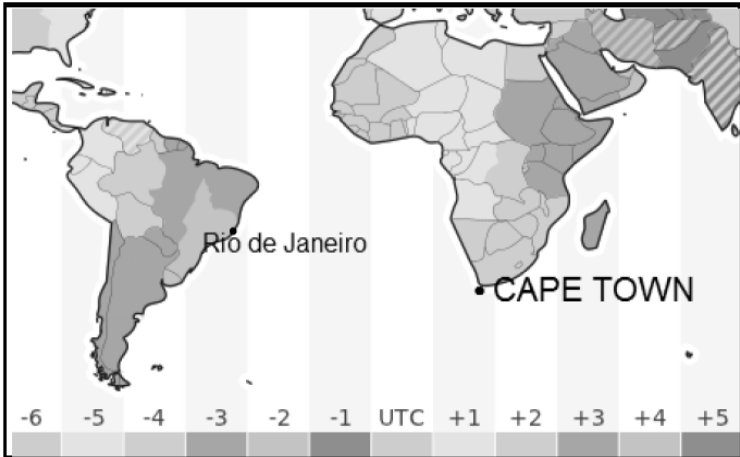
- 6.5 The area of a sector of a circle with radius 7cm is 15cm^2 . Find the measure of the central angle of the sector in degrees. (5)

[24]

Question 7

The picture below refers to a question that was posed to grade 6 learners in an Annual National Assessment test. Learners had to answer two questions:

Examine the map below and answer the questions that follow:



- What is the time difference between Cape Town and Rio de Janeiro?
- If it is 11:00 am in Rio de Janeiro, what time is it in Cape Town?

- 7.1 Answer the two questions posed to the learners. (4)
- 7.2 Discuss the problems that learners could experience with the reading of time zones. Give at least three valid points (6)

[10]

TOTAL: [155]

Addendum B: Second semester assignments**Assignment 01 is compulsory for examination admission****Unique number: 828425****Due date: 13 August 2018****Remember****Make sure you fill in the following information in the space provided on the mark-reading sheet.**

- **Student number:**
- **Module code: MAE103L**
- **Unique number: 828425**
- **Assignment number: 01**

- 1 A thermostat is an instrument used to
 - 1 Measure heat in the system
 - 2 Increase heat in the system
 - 3 Control heating and cooling system
 - 4 Decrease heat in the system
- 2 A rainwater tank has a diameter of 160 cm and a height of 190 cm. The tank is half-full. The water is used at a rate of 25, 5 litre per day. On what day will the tank run dry, assuming that no rainfall in that time?
 - 1 29.8 days
 - 2 19.1 days
 - 3 74,9 days
 - 4 73,7 days
- 3 The SI unit for measuring time is
 - 1 lunar months
 - 2 hours
 - 3 minutes
 - 4 seconds

- 4 Joy's mass on earth is 50kg . How will her mass compare on the moon?
- 1 Her mass will be the same
 - 2 Her mass will be more
 - 3 Her mass will be less
 - 4 It is impossible to tell
5. A quarter of a circle given alongside has a radius of 5 cm . Calculate its perimeter.
- 1 $10\pi\text{ cm}$
 - 2 $2.5\pi\text{ cm}$
 - 3 $20\pi\text{ cm}$
 - 4 $2.5\pi\text{ cm} + 10\text{ cm}$
- 6 Andrew's parents follow a regular schedule for taking care of their car. They change the oil every $3\,000\text{ km}$, rotate the tyres every $10\,000\text{ km}$ and replace the wiper blades every $15\,000\text{ km}$. After how many kilometres will they first have to change the oil, rotate the tyres and replace the wiper blades all at once?
- 1 $10\,000\text{ km}$
 - 2 $15\,000\text{ km}$
 - 3 $30\,000\text{ km}$
 - 4 $60\,000\text{ km}$
- 7 Water boils at 100°C at sea level. What is the freezing point of water at sea level in degrees Fahrenheit?
- 1 0°F
 - 2 32°F
 - 3 212°F
 - 4 32°C

- 8 A light year is the distance that light travels in one year. The speed of light is about 300 million m/s. The earth is about 150 million km from the sun. How long does it take a beam of light to travel from the sun to the earth?
- 1 8 min 3 seconds
 - 2 8 min 18 seconds
 - 3 8,33 seconds
 - 4 2×10^{-3} seconds
- 9 Find the area of the corresponding major sector if its radius is 4 cm and minor sector has an angle of 30° .
- 1 $\frac{16\pi}{12}$
 - 2 16π
 - 3 $16\pi - \frac{16\pi}{12}$
 - 4 $\frac{52\pi}{3}$
- 10 The average mass of 50 pumpkins is 2,1kg. If one more pumpkin is added, the average mass is 2,2kg. What is the mass of the extra pumpkin?
- 1 7,2 kg
 - 2 2,15 kg
 - 3 2,2 kg
 - 4 5kg

TOTAL:10

Unique number: 724699

Due date: 10 September 2018

NOTE

- This assignment covers the material in Tutorial Letter 501 and chapter 19 in the prescribed book. You will also have to do some reading or research for questions 1 and 2, which test your general knowledge on measurement.
- Always provide the correct units of measurement when calculations are required.

Question 1

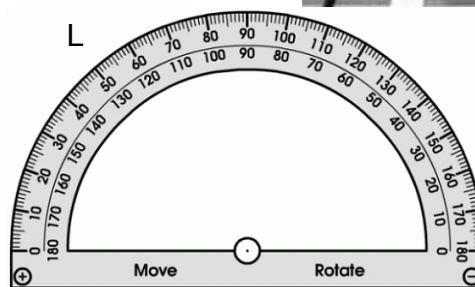
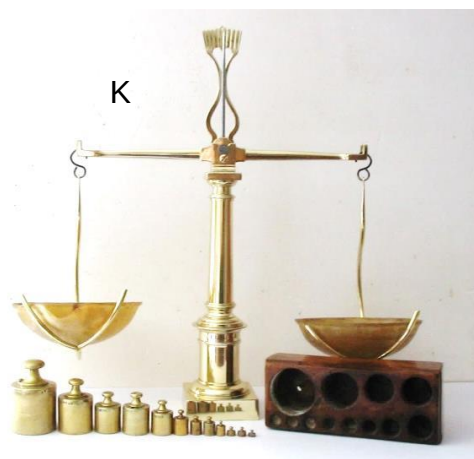
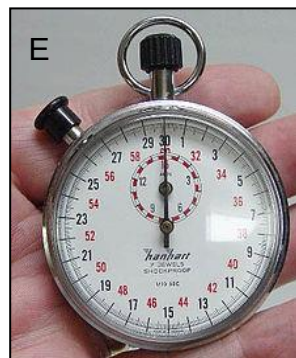
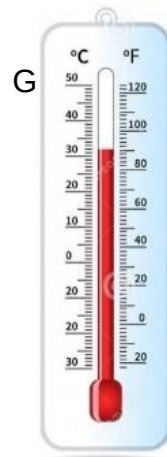
This question consists of twenty short questions over a wide range of measurement. The purpose of this question is to broaden your knowledge of measurement. You might need to do some research.

- 1.1 Name two different instruments that can be used to measure time.
- 1.2 What is the temperature of boiling water at sea level? Is the boiling point at Durban and Johannesburg the same? Explain your answer.
- 1.3 How many square metres in a square kilometre?
- 1.4 Why is our calendar called the Gregorian calendar?
- 1.5 What is a leap year? Were both the years 1900 and 2000 leap years?
- 1.6 If I say that my pencil is 10 cm long, what is the shortest possible length to two decimal places that it could be.
- 1.7 What is a thermostat?
- 1.8 How many seconds are there in a day?
- 1.9 What does the symbol π stand for? Where do we use it in measurement?
- 1.10 What is a Lunar month?
- 1.11 After whom is the month "August" named?

- 1.12 What is the speed of light?
- 1.13 What is the measure of pure gold?
- 1.14 What is the Russian monetary unit?
- 1.15 How long is an Ell?
- 1.16 How many cubic centimetres are there in a litre?
- 1.17 How many litres is one gallon?
- 1.18 What does SI stand for in measurement?
- 1.19 What is solstice and equinox?
- 1.20 Convert 500m/sec to km/h

[40]

Question 2



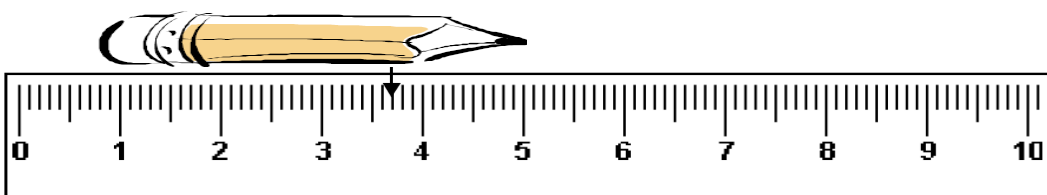
[24]

Question 3

- 3.1 What are the benefits of the use of non-standard units of measurement? Give three valid points. (3)
- 3.2 What does SI stands for in measurement? (1)
- 3.3 What does the symbol π stand for? Where do we use it in measurement? (2)
- 3.4 How can Piaget's theory of readiness assist a teacher in the teaching of measurement? (5)
- 3.5 Give an example of testing for readiness of the concept "length" (6)
- 3.6 What is the difference between volume and capacity? (2)
- 3.7 Convert the following:
- 3.7.1 $10g = \text{ ______ } kg$
- 3.7.2 $15 \text{ square kilometres} = \text{ ______ } \text{ square metres}$
- 3.7.3 $100 \text{ ml} = \text{ ______ } kl$ (3)

[22]Question 4

- 4.1 What does *perimeter* mean? (2)
- 4.2 Accurately draw two rectangles with the same perimeter but different areas, calculating the area in each case. Indicate the dimensions of the rectangles on your figures. (6)
- 4.3 In a test on the measurement of length, Edna looked at the picture, and said the pencil is 5 cm long.



4.3.1 What will you as a teacher do to help her to take the correct measurement? (2)

4.3.2 Make two more drawings where learners have to read from different scales. (4)

[14]

Question 5

5.1 Design a worksheet which addresses temperature concepts to grade 5 learners. Supply the solutions to the activities. (5)

5.2 If all edges of an equilateral triangular-based right prism are s units long, find the

5.2.1 Volume of the prism in terms of s . (4)

5.2.2 Surface area of the prism in terms of s . (4)

5.3 A learner in your class says that “area = length $\times$ breadth”. How will you help him or her to understand the concept of area? (4)

5.4 Design an activity for grade 7 learners to develop an understanding of the formula for area of a rectangle. Supply a memorandum for your activity. (7)

[24]

Question 6

6.1 Meraai takes two rectangular sheets of paper of 30cm by 20cm, and folds them into two tube shapes (cylinders). The one is short and fat, and the other is long and thin.

6.1.1 By calculation, determine which cylinder will have the biggest volume. (5)

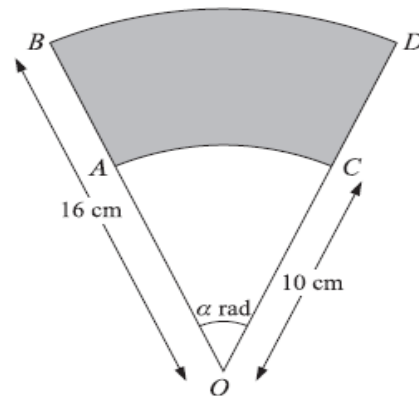
6.1.2 Explain the reason for this phenomenon. (2)

[7]

Question 7

7.1 In the diagram alongside, OAB and OCD are sectors of a circle, centre O and radius 16 cm.

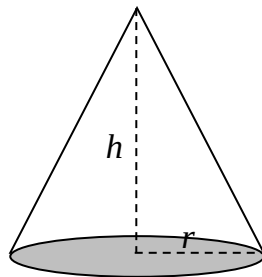
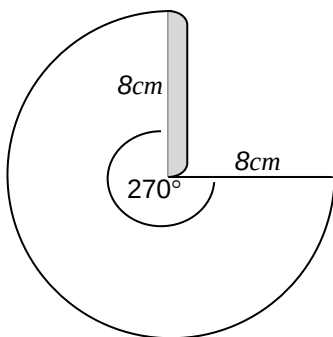
Angle $AOC = \alpha$ radians. AC and BD are arcs of circles, centre O and radii 10 cm and 16 cm respectively.



7.1.1 In the case where $\alpha = 0,8$ radians find the area of the shaded region. (5)

7.1.2 Find the value of α (in degrees) for which the perimeter of the shaded region is 40 cm. (4)

7.2 Calculate the volume of the cone shaped paper cup that can be folded from the circle sector illustrated below. Give your answer correct to 1 decimal point. (First calculate the radius of the base and the height of the cup) (5)

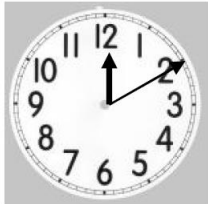


Volume of cone = $\frac{1}{3} \pi r^2 h$

[14]

Question 8

8.1 The picture below refers to a question that was posed to grade 6 learners in an Annual National Assessment test. Learners had to answer two questions:

			
CAPE TOWN	LONDON	BANGKOK	BERLIN
	Monday 5.10 p.m.	Monday 12.10 p.m.	Monday 6.10 p.m.

The clocks below show the times in different countries. If it is 06.10 p.m. in Berlin, it is 5.10 p.m. in London.

- If the clock in Berlin shows Tuesday 9:30 a.m., write down what the time will be in Bangkok?
- The time in London is 2 hours behind South Africa. Draw the hands on the clock of the time it will be in Cape Town when it is 5:10 p.m. in London.

8.1 Answer the two questions posed to the learners. (4)

8.2 Discuss the problems that learners could experience with the reading of time on a watch. Give at least three valid points (6)

[10]

TOTAL: 155