Tutorial Letter 101/3/2018

Basic Numeracy

BNU1501

Semesters 1 and 2

Department of Decision Sciences

Important information

- This tutorial letter contains the assignment questions and other important information about your module.
- Please register on myUnisa, activate your myLife email addresses and make sure you have regular access to this module’s website, BNU1501-2018-S1/S2.
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1 INTRODUCTION AND WELCOME

Dear Student

We are pleased to welcome you to the Department of Decision Sciences and specifically to the module, BNU1501: Basic Numeracy. We hope that you will find this module both interesting and rewarding. We will do our best to make your study of this module successful. You will be well on your way if you start studying immediately and resolve to do the assignments properly.

It is essential that you read this Tutorial Letter 101 very carefully. Tutorial Letter 101 contains the assignment questions and other important information about this module.

1.1 The study material

1.1.1 The Despatch Department

The Despatch Department should supply you with hard copies of the following:

- one study guide
- Tutorial Letter 101 (this tutorial letter)

The above will be despatched to you as soon as possible. However, because we have experienced problems with strikes at the post office and disruptions at campuses, we want to recommend strongly that you make use of the study material that is posted on the BNU1501 module site on myUnisa at https://my.unisa.ac.za.

According to the language policy of Unisa, all study material and examination papers will be in English only.

1.1.2 The rest of the study material

The rest of the study material will be posted on the BNU1501 module site only on myUnisa under Official Study Material and under Additional Resources:

- the Workbook for extra examples and exercises
- Tutorial Letters 201 and 202 that contain the solutions to the assignments (These will be posted after the respective assignments have been closed for submission.)
- any other tutorial letters that may be necessary
- some old examination papers, posted on the BNU1501 site, under Official Study Material, by the Examination Section. (The solutions to these examination papers are not available. You may contact us if you get stuck with a question.)

Take note that there is no prescribed book for this module.

1.1.3 The Prescribed Financial Calculator

You have to purchase the prescribed SHARP EL 738FB Financial Calculator. Unisa does not provide it. This calculator is essential in studying this module and other modules including Financial Mathematics. Read the lecturer’s Announcements on the calculator on the BNU1501 module site.
1.2 myUnisa

It is imperative that you make use of myUnisa. You must use your myLife email accounts and read your emails on it. The lecturer relies on it that you read her personal Welcome Message and Announcements on the main BNU1501-18-S1 or BNU1501-18-S2 module site.

You must ensure that you have access to a computer that is linked to the internet to enable you to gain quick access to your study material and other resources and information at the University. It makes communication with your lecturers, with other students and with the administrative departments of Unisa much easier – all through a computer and the internet.

To go to the myUnisa website, start at the main Unisa website, at http://www.unisa.ac.za, and then click on the “Login to myUnisa” link. This should take you to the myUnisa website. You can also go there directly by typing in https://my.unisa.ac.za.

2 PURPOSE AND OUTCOMES

You will find the purpose of and outcomes for this module under Additional Resources on the BNU1501 module site.

3 LECTURER AND CONTACT DETAILS

3.1 Lecturer

The name and contact details of the lecturer responsible for this module will be posted on the BNU1501 module site on myUnisa. We suggest that you write the name and contact details of the lecturer in the space below, for your convenience.

The lecturer of BNU1501 will assist you with any problems you may experience with the contents of the study material (not with administrative matters). You are welcome to contact the lecturer by e-mail or telephone, or to make an appointment to see him/her in person.

Take note that the lecturer has other academic obligations too and is not available on a full-time basis. Therefore, you will have to contact him/her in advance to make an appointment if you wish to see him/her in person. Always have your module code and student number at hand when contacting your lecturers.
3.2 Department

Department of Decision Sciences
Tel: 012 433 4684
E-mail: qm@unisa.ac.za

3.3 University

To contact the University, you should follow the instructions given on the Unisa website at https://my.unisa.ac.za under Contact us (the last tab on the second horizontal row of tabs). Remember to include or quote your student number when you contact the University.

4 STUDENT SUPPORT SERVICES

For academic support, you may contact your lecturer. Use the contact details on the BNU1501 module site on myUnisa.

For administrative support, use the Contact us link referred to in section 3.3 above.

If you want to know whether your assignment has been received, registered, processed or returned, please check on the BNU1501 module site under Assessment Info on myUnisa.

- Face-to-face tutors

  Face-to-face tutoring involves face-to-face contact sessions between the students and the tutor, which means that students meet with their tutors in a classroom setup, at designated venues and at specific times at the Unisa regional Learning Centres. Face-to-face tutors are qualified experts who are practitioners and specialists in the subjects in which they are appointed.

  To join face-to-face tutorials you need to go to the Unisa Regional Learning Centre nearest to you. The regional offices will supply you with the dates, place and times of the sessions for the modules that you have enrolled for. Note that not all regional offices offer tutor classes. Only if enough students enroll for a specific module at a certain centre, the regional manager will arrange that UNISA appoints a tutor for that region.

- E-tutors

  E-tutoring entails the delivery of teaching and learning online via the internet. An e-tutor is the person who undertakes the role of supporting and enabling students to learn online effectively. E-tutors are qualified experts who are practitioners and specialists in the subjects in which they are appointed.

  You will be grouped and allocated to an e-tutor after the registration process has ended. You will receive a system-generated myLife e-mail notification, informing you that you are allocated to an e-tutor. To contact your tutor log on to myUnisa and you will see an additional tab for example BNU1501-18-S1-1E or BNU1501-18-S2-3E. Once you have opened this tab, you can start communicating with your e-tutor using the Discussion Forum or other communication tools available on the group site as prescribed.
5 STUDY PLAN

This is a semester module and therefore study time is limited. In this short time, you have to work through the study material and prepare for the examination.

The lecturer’s advice for good time management is as follows:

- Plan your day and a study schedule that suits your personal circumstances and stick to it. Discuss this with your family and friends so that they know and respect the fact that you are serious about your studies and that you will not be available at certain hours of the day. Remember to build enough sleep into this plan as well. Self-discipline is the key to success in studying at a distance.

- Learn the content in the Study Guide chapter by chapter. Work through the first chapter, thoroughly as if you are studying for the examination. Do all the examples and exercises. Do not proceed with the next exercise or chapter before you are sure you have mastered the current one. If you study each chapter in this manner, you will have much more time for revision before the examination.

- The closing dates of the assignments will be an indication of how much time you can spend on a chapter. You need to have mastered the first three chapters for the first assignment. The next four chapters have to be studied before the second assignment is attempted.

- A semester is much shorter than you think, therefore we advise you to start studying immediately. This is to ensure that you have enough time for proper revision. The more times you work through the study material, the better prepared you will be to answer the questions in the examination.

6 ASSESSMENTS

6.1 Assessment plan

This tutorial letter contains two compulsory assignments; two for the first semester and two for the second semester.

You must submit your assignments online, under Assessment Info on the module site.

Both the assignments in a semester count to your semester mark. All assignments must be submitted on time. Late assignments will not be marked, which will have a negative effect on your semester mark.

Your mark for Assignment 01 will contribute 50% to your semester mark. Assignment 01 is based on chapters 1, 2 and 3 in the study guide.

Your mark for Assignment 02 will contribute 50% to your semester mark. Assignment 02 is based on chapters 4 to 7 in the study guide.

All registered students will find the solutions to these compulsory assignments on the module site on myUnisa, after the respective due dates. No hard copies of the solutions will be sent to you.

IMPORTANT NOTE: EXAMINATION ADMISSION

In order to gain examination admission, you must submit at least one assignment by 6 April 2018 for Semester 1 students, or by 31 August 2018 for Semester 2 students. That means, if you have not submitted Assignment 01 on time, you will have to submit Assignment 02 before 6 April 2018 for Semester 1 students or by 31 August 2018 for Semester 2 students.
6.2 Unique assignment numbers and due dates

6.2.1 Semester 1

<table>
<thead>
<tr>
<th>Assignment 01</th>
<th>Assignment 02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due date</td>
<td>Assignment 01</td>
</tr>
<tr>
<td>19 March 2018</td>
<td>18 April 2018</td>
</tr>
<tr>
<td>Unique number</td>
<td>753641</td>
</tr>
<tr>
<td>Chapters</td>
<td>1, 2 and 3</td>
</tr>
</tbody>
</table>

6.2.2 Semester 2

<table>
<thead>
<tr>
<th>Assignment 01</th>
<th>Assignment 02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due date</td>
<td>Assignment 01</td>
</tr>
<tr>
<td>15 August 2018</td>
<td>17 September 2018</td>
</tr>
<tr>
<td>Unique number</td>
<td>783587</td>
</tr>
<tr>
<td>Chapters</td>
<td>1, 2 and 3</td>
</tr>
</tbody>
</table>

6.2.3 The due date of an assignment is the last date at which the assignment should be submitted via myUnisa. No extension of due dates can be granted because the solutions will be published right after that date.

Assignments may not be submitted by fax or e-mail but must be submitted on the module site via myUnisa.

To submit an assignment on myUnisa:
- Go to https://my.unisa.ac.za.
- Log in using your student number and password (register first).
- Select the module from the orange bar.
- Click on Assessment Info in the left menu.
- Click on the assignment number you want to submit.
- Follow the instructions.

6.3 Assignment enquiries

The lecturer can assist you with any enquiries relating to the content of the study material, the assignment questions and the solutions to them.

However, note that neither the Department of Decision Sciences, nor the School of Economic Sciences will be able to answer your general administrative assignment enquiries. If you wish to know whether your assignment has been received, registered, processed or returned, please check on the BNU1501 module site under Assessment Info on myUnisa or send an e-mail to assign@unisa.ac.za.

6.4 Semester mark

- If you obtain the subminimum of 40% for the examination paper, your semester mark will contribute 20% and the examination mark 80% to your final mark.
- If you obtain less than 40% for the examination paper your semester mark will not count towards your final mark. Therefore, final mark = 0,2 × semester mark + 0,8 × examination mark.
6.5 Assignment questions

You will find the assignment questions for both semesters at the end of this document.

7 EXAMINATION

Those of you registered for the first semester will write the BNU1501 examination in May/June, and those of you registered for the second semester will write the examination in October/November. During the relevant semester, the Examination Section will provide each of you with information about the examination venue, date and time. You can find the provisional examination dates on the main Unisa website. Your personal, final exam timetable will be available on myUnisa, under myAdmin, after the examination admissions have been done. Please make sure that you know the correct date, time and venue for your examination, and plan accordingly. We cannot accept any excuses for failure to adhere to the date, time or venue.

If for some serious reason, like illness, you cannot write the examination, send an email to exams@unisa.ac.za.

Here is some information about the examination paper:

- The duration of the examination is two hours.
- The examination paper will consist of multiple choice questions only.
- You will have to mark the answers with an HB pencil on a mark reading sheet. (See example and instructions below.) Make sure you have an HB pencil, an eraser and a shapener with you.
- A formula sheet will be attached to the examination paper. The formulas will not be labelled, which means you will have to know which formula you need to apply in a certain question.
- The blank pages in the examination paper can be used for rough work. Note that these will not be marked.
- The examination paper will cover all the content of the study guide.
- The use of a financial calculator will be allowed in the examination. Only your writing materials and a calculator will be allowed in the examination hall.
- As soon as the answer sheets of all the Examination Section have been received by the Examination Section, the answers will be marked by a computer. This may take place more than a month after the examination date.
- To pass this module, you must obtain a final mark of at least 50%.
- Previous examination papers are published on myUnisa for extra exercises, but no memoranda are made available. You may contact us if you get stuck with a certain question, but you have to have attempted doing it and indicate to us exactly where you got stuck. You should not rely on old examination papers to pass the module.
MARK READING SHEET INSTRUCTIONS

Your mark reading sheet is marked by computer and should therefore be filled in thoroughly and correctly.

USE ONLY AN HB PENCIL TO COMPLETE YOUR MARK READING SHEET

PLEASE DO NOT FOLD OR DAMAGE YOUR MARK READING SHEET

Consult the illustration of a mark reading sheet on the reverse of this page and follow the instructions step by step when working on your sheet.

Instruction numbers 1 to 10 refer to spaces on your mark reading sheet which you should fill in as follows:

1. Write your paper code in these eight squares, for instance:

   B N U 1 5 0 1

2. The paper number pertains only to first-level courses consisting of two papers.

   WRITE 0 1 for the first paper and 0 2 for the second. If only one paper, then leave blank.

3. Fill in your initials and surname.

4. Fill in the date of the examination.

5. Fill in the name of the examination centre.

6. WRITE the digits of your student number HORIZONTALLY (from left to right). Begin by filling in the first digit of your student number in the first square on the left; then fill in the other digits, each one in a separate square.

7. In each vertical column mark the digit that corresponds to the digit in your student number as follows: [-].

8. WRITE your unique paper number HORIZONTALLY.

   NB. Your unique paper number appears at the top of your examination paper and consists only of digits (e.g. 403326).

9. In each vertical column mark the digit that corresponds to the digit number in your unique paper number as follows: [-].

10. Question numbers 1 to 140 indicate corresponding question numbers in your examination paper. The five spaces with digits 1 to 5 next to each question number indicate an alternative answer to each question. The spaces of which the number correspond to the answer you have chosen for each question and should be marked as follows: [-].

   For official use by the invigilator. Do not fill in any information here.
8  FREQUENTLY ASKED QUESTIONS

You will find frequently asked questions and answers under Additional Resources on the module site.

9  NOTES ON THE SHARP EL-738FB CALCULATOR

9.1 General

You must purchase the SHARP EL-738, the SHARP EL-738F or the SHARP EL-738FB (newest version) calculator. This calculator can do basic calculations and financial calculations.

Most of the keys can perform two functions.

To perform a function written on the key, simply press the key. To perform a function written on the surface just above the key, first press the orange [2ndF] key to activate it to perform the function when pressed.
Display screen
Power ON/OFF and clear key
Mode key
Numerical and arithmetic keys
Cursor keys
Key operation keys
9.2 Switch on your calculator

Before using your calculator for the first time, reset (initialise) it. Press the RESET switch located on the back of the calculator with the tip of a ball-point pen.

After the calculator has been reset, the initial display of the NORMAL mode will appear.

<table>
<thead>
<tr>
<th>TAB</th>
<th>DEG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0000</td>
</tr>
</tbody>
</table>

NOTE:
Pressing \texttt{2ndF M-CLR} 1 \texttt{=} will also erase all stored data in the memory and restore the calculator’s default setting.

Note that the numbers 0 to 9 will not be written in blocks in explanations. All the other functions will be written in blocks, as in the previous sentence.

9.2.1 The SETUP menu

Press the \texttt{SET UP} key to display the SETUP menu.

\begin{center}
\begin{tabular}{ccc}
\texttt{DSP} & \texttt{DRG} & \texttt{DEPR} \\
0 & 1 & 2 \\
\end{tabular}
\end{center}

will appear on the screen. If you press the \texttt{◮} arrow three times.

\begin{center}
\begin{tabular}{c}
\texttt{DATE} \\
3 \\
\end{tabular}
\end{center}

will appear on the screen.

A menu item can be selected by using the \texttt{◧} \texttt{◫} keys (the selected number will blink) and then pressing the \texttt{=} key.

\textbf{To set the number of decimals to be displayed:}

Press \texttt{SET UP} 0 0.
DIG(0-9)?

will appear on the screen.
Press 4 to select 4 decimals

0.0000

In short, if you want four decimals, press \textbf{SETUP} 0, 0, 4.
If you want two decimals, press \textbf{SET UP} 0, 0, 2.
We prefer to use four decimals and to round off ourselves when necessary, therefore press \textbf{SET UP} 0, 0, 4.

NOTE: Keep in mind that the calculator displays a decimal point (0.0000), whereas we use the decimal comma (0,00) in South Africa.

9.3 Selecting a MODE

Press \textbf{MODE}.
The menu display will appear.

NORMAL  STAT
0 1

Press 0 because you need the NORMAL mode.

0.0000

will appear on the screen.
The NORMAL mode allows you to perform financial, arithmetic and scientific calculations.
(In this module, we do not use the STATISTICAL mode.)
9.4 Calculator keys

The keys are classified according to the functions they perform.

The following keys are worth mentioning:

- **ON:** \[ \text{ON/C} \]
  The \[ \text{ON/C} \] key is the last key in the first row. Press this key to switch the calculator on. The \[ \text{ON/C} \] key also clears the screen. To preserve the batteries the calculator turns itself off after about 10 minutes if not in use.

- **OFF:** \[ \text{ON/C} \]
  OFF is the orange function above the red \[ \text{ON/C} \] key. Press \[ \text{2ndF} \ \text{ON/C} \] to switch your calculator off.

- **NUMERIC KEYS:** 1, 2, 3 ... 9, 0
  These keys are used to enter numbers.

- **MULTIPLICATION:** \[ \times \]
  Second last key, third last row

- **DIVISION:** \[ \div \]
  Second last key, sixth row

- **EQUAL:** \[ = \]
  Last key, last row

- **CLEAR:** \[ \text{ON/C} \]
  Last key, first row

- **BRACKETS:** \[ ( ) \]
  Last key, third last row and second last row, respectively.

  Use the \[ ( \] and \[ ) \] keys to place parentheses around parts of expressions. The closing parenthesis \[ ) \] may be omitted.

- **NEGATIVE:** \[ +/- \]
  Second key, last row

  This key is used to enter a negative number or to change the sign of a number, while the \[ - \] key is used for the operation of subtraction. Note the different ways in which subtraction, with the long dash, and the sign of the number, with a small dash, are displayed.

  For example: \( 3 - 2 \) and \( 3 + (-2) \)

  **Example:**
  Add 8 to \(-5\).
  Press \( 8 \ + \ +/- \ 5 \ = \)
The answer is 3.
Subtract $-5$ from 8.
Press $8 - 5 = 3$

The answer is 13.
Subtract $-5$ from $-8$.
Press $\pm 8 + \pm 5 = -3$

The answer is $-3$.
Add $-5$ to $-8$.
Press $\pm 5 + \pm 8 = -13$

**DELETE:**
If you made a mistake, press $\text{DEL}$ (last key, sixth row) to erase the last number and then enter the correct number to continue.

If you want to change a number or sign after you have pressed $=$, use the $\blacktriangledown$ cursor to move to the place where you want to change it. Enter the new number or sign, then press $\text{DEL}$ and continue.

**INSERT:**
Use the $\blacktriangledown$ cursor to move to the place where you want to insert a number. Press $\text{2ndF INS}$ (sixth row, last key) and enter the number. The cursor will flicker after the inserted number.

**KEY $y^x$**

2ndF and third key, fourth row

**Example:**
Calculate $2^3$.
Enter the base number first — press 2.
Then press $\text{2ndF } y^x 3 = 8,00$.

If the power consists of more than one term, use brackets for the power.

**Example:**
Calculate $(3^2)^4$.
Press $\left( \begin{array}{c} 3 \text{2ndF } y^x 2 \end{array} \right) \text{2ndF } y^x 4 =$ or $3 \text{2ndF } y^x 2 = \text{2ndF } y^x 4 =$
The answer is 6,561,00.

**Example:**
Calculate $5^{2/3}$.
Press $5 \text{2ndF } y^x \left( \begin{array}{c} 2 \div 3 \end{array} \right)$
The answer is 2,92.
• SQUARE: \((x^2)\)
  Use the power key.

  **Example:**
  Calculate \(4^2\).
  Press \(4 \text{ 2ndF } y^x 2 \equiv\), or alternatively, \(4 \text{ 2ndF } x^2\)
The answer is 16.

  **Example:**
  Calculate \(10^{-1}\).
  Press \(10 \text{ 2ndF } y^x +/- 1 \equiv\)
The answer is 0,10.

  Calculate \(\frac{2}{5}\).
  Press \(2 \div 5 \text{ 2ndF } y^x 2 \equiv\)
The answer is 0,08.

  Calculate \((\frac{2}{5})^2\).
  Press \(( 2 \div 5 ) \text{ 2ndF } y^x 2\)
The answer is 0,16.

• SQUARE ROOT: \(\sqrt{x}\)
  You can use the \(\sqrt{x}\) key. Press \(\text{2ndF}\) and the second key, in the fourth row.

  **Example:**
  Calculate \(\sqrt{64}\). \(\sqrt{64}\) means \(2\sqrt{64}\).
  Press \(2 \text{ 2ndF } \sqrt{64} \equiv\)
The answer is 8.

  Alternatively, press \(\text{2ndF } \sqrt{64} \equiv\). \(\sqrt{64}\) is the third key in the second last row.

  **Example:**
  Calculate \(\sqrt{64}\).
  Press \(3 \text{ 2ndF } \sqrt{64} \equiv\)
The answer is 4.

  **Example:**
  Calculate \(\sqrt{3^3}\).
  Press \(4 \text{ 2ndF } \sqrt{x} 3 \text{ 2ndF } y^x 3 \equiv\)
The answer is \(2,2795 \approx 2,28\).
• NUMERIC FRACTIONS

Example:
Calculate \( \frac{3}{4} - \frac{1}{2} \).
Press \( 3 \div 4 - 1 \div 2 \quad = \)
The answer is 0.25.

Calculate \( \frac{1}{2} + \frac{2}{3} + \frac{3}{5} \).
Press \( 1 \div 2 + 2 \div 3 + 3 \div 5 \quad = \)
The answer is 1.7667 \( \approx \) 1.77.

• LOGARITHM to the base e: \( \ln \)

Example:
Calculate \( \ln 3 \).
Press \( \boxed{2ndF} \ln\) (second key, second last row) \( 3 = \)
The answer is 1.0986 \( \approx \) 1.10.

Example:
Calculate \( \ln \left( \frac{\frac{1253}{1479}}{} \right) \).
Press \( \boxed{2ndF} \ln \left( \frac{1253}{1479} \right) \quad = \)
The answer is \(-0.1658 \approx -0.17\).

• THE EXPONENTIAL FUNCTION: \( e^x \) – the inverse of \( \ln \).

Example:
Calculate \( e^{1.10} \).
Press \( \boxed{2ndF} e^x \) (second key, last row) \( 1.10 = \)
The answer is 3.0042 \( \approx \) 3.

• MEMORY: M+

The calculator has 11 temporary memories (A-H and X-Z), one independent memory (M) and one last answer memory (ANS).

Temporary memory:
To store a value, press \( \boxed{STO} \) and the variable in which you want to store it.

Example: Store 17 in A.
Press \( 17 \boxed{STO} \) (fifth row, second key) \( \boxed{A} \) (first key, fourth row).

\[
17 \Rightarrow A \quad \text{TAB DEG} \]

\[
17.00
\]

will appear on the screen.
If you want to recall the value stored in A, press [RCL] (first key, fifth row) A.

A= 17.00

will appear on the screen.

Store a value (sum) in the independent memory M+: 

Example: Store 19, 21 and 25 in M+.
Press 19 [M+] (third key, fifth row).
Press 21 [M+]
Press 25 [M+]
To find the answer, press [RCL] [M+].
The answer is 65.

To clear the register:
Press [2ndF] [M-CLR] (first key, second row).

M MEM 0
RESET 1

will appear on the screen.
Press 0.

M CLR_MEMORY? 0

will appear on the screen.
Press 0.

0.0000

will appear on the screen.
• **ERROR**
  If ERROR 1 appears on the screen after you have done a calculation, press the \( \leftarrow \) key and the cursor will flicker where you made the mistake. Press \( \text{DEL} \) and continue by pressing \( = \).

• **PERCENTAGE** (fourth key, sixth row)
  
  **Example:**
  Calculate 25% of R1 800.
  Press \( 1 \, 800 \times 25 \, \text{2ndF} \, \% \).
  The answer is 450,00.

• **Pi:** \( \pi \)
  \( \text{2ndF} \, \pi \) last key, second last row.
The NORMAL mode allows you to use the financial keys. The financial keys are \( \text{N} \), \( \text{1/Y} \), \( \text{PV} \), \( \text{PMT} \), \( \text{FV} \) and \( \text{AMRT} \).

Before using the financial keys, first clear the register by pressing \( \text{2ndF} \) \( \text{M-CLR} \) 0, 0.
9.6 Interest rates

9.6.1 Simple interest

Note:
We do not use the financial keys on the calculator for Simple Interest problems.

Example 1.
Determine the amount of interest received if R1 200 is invested for 4 years at 14% simple interest per year.
The correct formula to use is
\[ I = Prt \]
\[ = 1200 \times 14\% \times 4 \]
\[ = 1200 \times 0.14 \times 4 \]
\[ = 672,000 \]
The interest received is R672,00.

Steps on the calculator:
1200 \( \times \) 0.14 \( \times \) 4 \( = \)
The answer is 672,000.

Example 2.
Determine the accumulated amount if R2 400 is invested for 42 months at a 9% simple interest rate per year.
The correct formula to use is
\[ S = P (1 + rt) \]
\[ = 2400 \left(1 + 9\% \times \frac{42}{12}\right) \]
\[ = 2400 \left(1 + 0.09 \times \frac{42}{12}\right) \]
\[ = 3156,000 \]
The accumulated amount is R3 156,00.

Calculator steps:
2400 \( \left(1 + \right) \) 0.09 \( \times \) 42 \( ÷ \) 12 \( = \)
The answer is 3 156,00.

Example 3.
Determine the simple interest rate if R3 600 accumulates to R5 760 in 5 years’ time.
\[ S = P (1 + rt) \]
i.e. \[ 1 + rt = \frac{S}{P} \]
i.e. \[ rt = \frac{S}{P} - 1 \]
i.e. \[ t = \left(\frac{S}{P} - 1\right) \div t \]
i.e. \[ r = \left(\frac{5760}{3600} - 1\right) \div 5 \]
i.e. \[ r = 0,1200 \]
The simple interest rate is 12%.

Calculator steps:
The answer is 0,12, that is, 12%.

**Note:**

Be careful when your calculator is SET UP to display only two decimal digits. If you use the ordinary keys on the financial calculator to find the simple interest rate, the calculator gives an answer rounded to two decimal digits. You have to go further and multiply this answer by 100 on the calculator to find the exact simple interest rate as a percentage to two decimals digits.

### 9.6.2 Compound interest

There are two methods to do Compound Interest calculations:

1. by substituting into the correct formula and using the ordinary calculator keys on the calculator
2. by using the financial keys on the calculator.

**Example 1.**

Calculate the future value if R5 000 is invested for five years at 15% per year, compounded monthly.

**Method 1:** By substituting in the formula:

\[
S = P \left(1 + \frac{i}{m}\right)^{tm}
\]

\[
= 5000 \left(1 + \frac{0.15}{12}\right)^{5 \times 12}
\]

\[
= 10535.9067
\]

The future value is R10 535.91.

**Steps by using ordinary calculator keys:**

5 000 \(1 \ + \ 0.15 \ ÷ \ 12 \) \(\text{2ndF} \ y^x \ 60 \ 5 \ = \)

**Method 2:** By using the financial keys on the calculator:

\(\text{2ndF} \ \text{CA}\) (This is always the first step in financial calculations. It clears the register.)

\(\text{2ndF} \ \text{P/Y} \ 12 \ \text{ENT} \ \text{ON/C}\) (This is always the 2nd step. It registers the number of compounding periods per year.)

\(5000 \ \text{PV}\) (Always enter \(\pm\) before the first given value.)

\(15 \ \text{I/Y}\) (Always enter the interest rate here as a percentage and NOT as a decimal.)

\(5 \ \text{2ndF} \ \times \ \text{P/Y} \ \text{N}\) (Always enter these three keys, in this specific order, after the time period of the investment, in years.)

\(\text{COMP} \ FV\) (Lastly, compute what is required in the question.)

The number 10 535,9067 is displayed, which is R10 535,91.
Note:

Distinguish between the $P/Y$ and $\times P/Y$ keys on the calculator.

Example 2.

Determine the time under consideration if R5 000 is invested at 15% per year, compounded half-yearly, and the accumulated amount is R10 000.

Method 1: By substituting in the formula:

$$S = P (1 + i)^n$$

$$10 000 = 5 000 \left(1 + \frac{0.15}{2}\right)^{t\times2}$$

$$t = 4.79$$  (See the note below.)

Note:

To find the value of an unknown in the exponent, one needs to have the mathematics knowledge of logarithms. However, logarithms are not included in the syllabus of this module, and are not explained in the study guide. Therefore, we have to use the financial keys on the calculator in these cases.

Method 2: By using the financial keys on the calculator:

2ndF CA  
2ndF P/Y 2 ENT ON/C  
+/- 10 000 FV  
5 000 PV  
15 I/Y  
COMP N  

N = 9.5844 appears on the screen, which is 9.5844 half-years.

We divide this answer by 2 because the number of compounding periods per year is 2 (semi-annually).

Press $\div$ 2 $=$.

4.7922 appears on the screen.

The time under consideration is thus 4.79 years.

9.7 Annuities

9.7.1 Present value

Example 3.

Calculate the present value of an annuity if quarterly payments of R1 600 are made for 5 years at an interest rate of 20% per year, compounded quarterly.
Method 1: By using the Present Value formula:

\[ P = R \left[ \frac{(1+i)^n - 1}{i(1+i)^n} \right] \]

\[ P = 1600 \left[ \frac{\left(1 + \frac{0.20}{12}\right)^{5 \times 4} - 1}{\frac{0.20}{12} \left(1 + \frac{0.20}{12}\right)^{5 \times 4}} \right] \]

\[ = 19939.5365 \]

The present value is R19 939.54. (See calculator steps below.)

**Calculator steps:**

\[ 1600 \times \left( 1 + \frac{0.20}{12} \right)^{5 \times 4} - 1 \]

\[ \div \left( \frac{0.20}{12} \times \left(1 + \frac{0.20}{12}\right)^{5 \times 4} \right) \]

\[ = 19939.5365 \]

Method 2: By using the financial calculator keys:

1. **2ndF** **CA**
2. **2ndF** **P/Y** 4 **ENT** **ON/C**
3. **+/−** 1600 **PMT**
4. 5 **2ndF** **×P/Y** **N**
5. 20 **I/Y**
6. **COMP** **PV**

The answer is 19939.5365, which is R19 939.54.

### 9.7.2 Future value

**Example 4.**

Determine the future value of an annuity if monthly payments of R400 are made for 5 years at 16% interest per year, compounded monthly.

**Method 1:** By substituting in the future value formula:

\[ S = R \left[ \frac{(1+i)^n - 1}{i} \right] \]

\[ = 400 \left[ \frac{\left(1 + \frac{0.16}{12}\right)^{12 \times 5} - 1}{\frac{0.16}{12}} \right] \]

\[ = 36414.2065 \]

The future value is thus R36 414.21.

**Calculator steps:**

\[ 400 \times \left( 1 + \frac{0.16}{12} \right)^{12 \times 5} - 1 \]

\[ \div \left( \frac{0.16}{12} \right) \]

\[ = 36414.2065 \]
Method 2: By using the financial keys on the calculator:

\[
\begin{align*}
\text{2ndF} & \quad \text{CA} \\
\text{2ndF} & \quad \text{P/Y} \quad 12 \quad \text{ENT} \quad \text{ON/C} \\
+/- & \quad 400 \quad \text{PMT} \\
5 & \quad \text{2ndF} \quad \times \quad \text{P/Y} \quad \text{N} \\
16 & \quad \text{I/Y} \\
\text{COMP} & \quad \text{FV}
\end{align*}
\]

The answer is R36 414.21.

9.8 Amortisation

Example 5.

Draw up an amortisation schedule for a loan of R5 000 that is repaid in annual payments over five years at an interest rate of 15% per year, by using the financial keys on the calculator.

Note:
- We use the financial keys on the calculator for amortisation calculations because drawing up an amortisation schedule by using the formula is time consuming.
- Always find the minimum monthly payment first when drawing up an amortisation schedule.

By using the financial keys on the calculator:

\[
\begin{align*}
\text{2ndF} & \quad \text{CA} \\
\text{2ndF} & \quad \text{P/Y} \quad 1 \quad \text{ENT} \quad \text{ON/C} \\
+/- & \quad 5 000 \quad \text{PV} \\
5 & \quad \text{2ndF} \quad \times \quad \text{P/Y} \quad \text{N} \\
15 & \quad \text{I/Y} \\
\text{COMP} & \quad \text{PMT}
\end{align*}
\]

1 491.5778 appears on the screen. (This is the minimum monthly payment.)

Subsequent steps:
Press \text{AMRT} (fourth row, first key) 1 \quad \text{ENT}

\text{▼} (Down arrow) 1 \quad \text{ENT}
Press \[ \downarrow \] 2 \[ \text{ENT} \] twice.  
Press \[ \downarrow \] \[ \text{PRINCIPAL} \] = 852.8145 appears on the screen, that is R852.81.  
Press \[ \downarrow \] \[ \text{INTEREST} \] = 638.7633 appears on the screen, that is R638.76.

Press \[ \downarrow \] 3 \[ \text{ENT} \] twice.  
Press \[ \downarrow \] \[ \text{PRINCIPAL} \] = 980.7366, that is R980.74.  
Press \[ \downarrow \] \[ \text{INTEREST} \] = 510.8412, that is R510.84.

Press \[ \downarrow \] 4 \[ \text{ENT} \] twice.  
Press \[ \downarrow \] \[ \text{PRINCIPAL} \] = 1127.8471, that is R1127.85.  
Press \[ \downarrow \] \[ \text{INTEREST} \] = 363.7307, that is R363.73.

Press \[ \downarrow \] 5 \[ \text{ENT} \] twice.  
Press \[ \downarrow \] \[ \text{PRINCIPAL} \] = 1297.0242, that is R1297.02.  
Press \[ \downarrow \] \[ \text{INTEREST} \] = 194.5536, that is R194.55.

Note: The PRINCIPAL + the INTEREST = the PAYMENT  
e.g. 1297.0242 + 194.5536 = 1491.5778, or  
1127.8471 + 363.7307 = 1491.5778, or  
980.7366 + 510.8412 = 1491.5778, or  
852.8145 + 638.7633 = 1491.5778, or  
741.5778 + 750.000 = 1491.5778, or  
: : :
10 ASSIGNMENTS

FOR SEMESTER 1 STUDENTS ONLY
ASSIGNMENT 01
Study material: Chapters 1, 2 and 3 in the Study Guide
Unique assignment number: 753641
FIXED DUE DATE: 19 MARCH 2018

Important:
• This is a multiple-choice assignment that must be answered and submitted ONLINE using myUnisa. Go to Assessment Info on the BNU1501 module site and follow the steps.
• Always keep your detailed workings in a file so that you can compare your solutions to the ones that will be published on the module site on myUnisa after the due date. Also, keep a copy of the options you have chosen, in case of a query.
• The due date date of this assignment is fixed. No extension can be granted because the solutions are posted on the BNU1501 module site shortly after the closing date.

Question 1
Round 10,99458 off to three decimal digits.

[1] 10,994  
[2] 11,900  
[3] 10,996  
[4] 10,995  

Question 2
Round 10,99458 off to two decimal digits.

[1] 10,90  
[3] 10,10  
[4] 11,00  

Question 3
Round 10,99458 off to the first decimal digit.

[1] 10,9  
[2] 20,0  
[3] 11,0  
[4] 11,9
Question 4
Suppose an ice cream costs twice as much as a chocolate. If the ice cream costs $x$ rand, how much, in terms of $x$, does the chocolate cost?

[1] $\frac{x}{2}$ rand  
[2] $2x$ rand  
[3] $(x + 2)$ rand  
[4] $\frac{2}{x}$ rand

Question 5
Refer to question 4 above.
Suppose John buys a chocolate and an ice cream. How much, in terms of $x$, does he pay for them?

[1] $(x + 2x)$ rand  
[2] $(x + \frac{x}{2})$ rand  
[3] $2x$ rand  
[4] $2(x + 2x)$ rand

Question 6
Refer to questions 4 and 5 above.
How much change will John receive if he pays with a R50 note for the chocolate and ice cream? (Assume that the cost of a chocolate and an ice cream is less than R50.)

[1] $(50 - x + \frac{x}{2})$ rand  
[2] $(x + \frac{x}{2} - 50)$ rand  
[3] $(50 - x - \frac{x}{2})$ rand  
[4] $(50 - x + 2x)$ rand

Question 7
A cast-iron rod is 30 metres long. It has to be cut in two pieces such that the one piece is 8 metres longer than the other. Suppose the longer piece is $p$ metres. How long, in terms of $p$, should the shorter piece be?

[1] $(8 - p)$ metres  
[2] $(8 + p)$ metres  
[3] $(p - 4)$ metres  
[4] $(p - 8)$ metres
Question 8
John travels $x$ kilometres in 3 hours, at a certain average speed. An expression, in terms of $x$, for the distance that John travels in 5 hours, at the same average speed, is ...

[1] $5x$ km  
[2] $\frac{5x}{3}$ km  
[3] $\frac{5x}{5}$ km  
[4] $15x$ km

Question 9
A biscuit manufacturer uses 200 grams of flour, 50 grams of sugar and 100 grams of butter for each packet of biscuits produced. What amount of butter is needed to produce $x$ packets of biscuits?

[1] 100$x$ kg  
[2] 0,1$x$ kg  
[3] 0,01 kg  
[4] $\frac{x}{0,01}$ kg

Question 10
Simplify the following expression as far as possible:

$$xy + 3x^2y + 1 + 2xy^2 + yx^2 + 2 + yx$$

[1] $2xy + 4x^2y + 2xy^2 + 3$  
[2] $11x^2y^2$  
[3] $x^2y^2 + 4x^4y^2 + 3 + 2xy^2$  
[4] $2xy + 6x^2y + 3$

Question 11
Simplify the following expression as far as possible:

$$\sqrt[3]{36a^{10}b^{36}}$$

[1] $6a^8b^{18}$  
[2] $6a^4b^6$  
[3] $18a^8b^{18}$  
[4] $18a^4b^6$
Question 12
Simplify the following expression as far as possible:

$$2y^2 (x - 1) - 8x (y^2 + 1)$$

[1] $2yx^2 - 2y^2 - 8xy^2 - 8x$
[2] $-6xy^2 - 2y^2 - 8x$
[3] $8x - 2y^2 - 6y^2 x$
[4] $-x - y^2 - 6xy^2$

Question 13
Simplify the following expression as far as possible:

$$\left(3ab^2c^3\right)^2 \div (ab) \times (2a^3b^4)$$

[1] $6b^7c^6a^4$
[2] $18a^4b^4c^5$
[3] $12a^4b^7c^6$
[4] $18a^4b^7c^6$

Question 14
Write $\frac{101}{10}$ as a mixed fraction.

[1] $1 \frac{1}{10}$
[2] $1 \frac{101}{10}$
[3] $10 \frac{1}{10}$
[4] $10 \frac{101}{101}$

Question 15
Write $\frac{82}{3}$ as an improper fraction.

[1] $\frac{16}{3}$
[2] $\frac{26}{3}$
[3] $\frac{16}{3}$
[4] $\frac{10}{3}$

Question 16
Determine the LCM (Lowest Common Multiple) of the following three numbers:

$4, 16$ and $14$

[1] $224$
[2] $896$
[3] $112$
[4] $16$
Question 17
Determine the LCM of the following three terms:

\[ x^2y^2, x^2y^3 \text{ and } x^3y^2 \]

[1] \( x^3y^3 \)
[2] \( xy \)
[3] \( x^7y^7 \)
[4] \( x^2y^3 \)

Question 18
Determine the LCM of the following three terms:

\[ 8ab, 14a^3b^2 \text{ and } 12a^2b^3 \]

[1] \( 168ab \)
[2] \( 1344a^3b^2 \)
[3] \( 336a^6b^6 \)
[4] \( 168a^3b^3 \)

Question 19
Simplify the following expression as far as possible without using a calculator:

\[ \frac{2}{3} + \frac{3}{7} - \frac{1}{2} \]

[1] \( \frac{1}{2} \)
[2] \( \frac{67}{42} \)
[3] \( \frac{25}{42} \)
[4] \( \frac{1}{1} \)

Question 20
Simplify the following expression as far as possible without using a calculator:

\[ \frac{3}{4} \div \frac{1}{6} \times \frac{5}{4} \]

[1] \( \frac{3}{4} \)
[2] \( \frac{5}{4} \)
[3] \( \frac{5}{52} \)
[4] \( \frac{5}{16} \)
Question 21
Simplify the following expression as far as possible without using a calculator:

\[ \frac{\frac{3}{4} + \frac{8}{9}}{\frac{4}{3}} \]

[1] \(2 \frac{5}{27}\)
[2] \(2\frac{1}{4}\)
[3] \(1\frac{17}{27}\)
[4] \(\frac{5}{7}\)

Question 22
Simplify the following expression as far as possible without using a calculator:

\[ \frac{\frac{2}{a} + \frac{3}{ab}}{} \]

[1] \(\frac{5}{2ab}\)
[2] \(\frac{4b + 6}{2ab}\)
[3] \(\frac{5}{a}\)
[4] \(\frac{2b + 3}{ab}\)

Question 23
Write \(\frac{3}{8}\) as a decimal number, rounded to three decimal digits, without using a calculator.

[1] 0.375
[2] 3.800
[3] 0.380
[4] 2.667

Question 24
Write 0.725 as an ordinary fraction.

[1] \(\frac{29}{40}\)
[2] \(7\frac{1}{4}\)
[3] \(\frac{29}{4}\)
[4] \(\frac{13}{20}\)
Question 25
Write $3\frac{5}{9}$ as a decimal number, rounded to three decimal digits, without using a calculator.

[1] 0.555
[2] 3.556
[3] 3.600
[4] 0.556

Question 26
Write 2,752 as an ordinary mixed fraction in its simplest form.

[1] $2 \frac{4}{7}$
[2] $2 \frac{94}{125}$
[3] $\frac{94}{125}$
[4] $\frac{188}{250}$

Question 27
Simplify the following expression as far as possible:

$$2 \cdot 3^2 \cdot 2^3 + 3^3$$

[1] 315
[2] 248 859
[3] 171
[4] 15 579

Question 28
The ratio of the female teachers to male teachers in a school is 4 : 3. If there are 12 male teachers at the school, how many teachers are there in total?

[1] 28
[2] 16
[3] 25
[4] 14

Question 29
Anna won R250 000 in a competition. She wants to share the money with her three sisters in a ratio of 4 : 1 : 3 : 2 for herself and her sisters, Linda, Sophia and Mary, respectively. The amount of money that Sophia will get is ...

[1] R25 000
[2] R100 000
[3] R50 000
[4] R75 000
**Question 30**

The increasing block tariffs per month for residential electricity for the 2016/2017 financial year are given below. The tariffs do not include VAT.

<table>
<thead>
<tr>
<th>Domestic supply / Usage in kWh</th>
<th>Rand per kWh (kilowatt hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100 kWh</td>
<td>1,3032</td>
</tr>
<tr>
<td>101-400 kWh</td>
<td>1,5250</td>
</tr>
<tr>
<td>401-650 kWh</td>
<td>1,6610</td>
</tr>
<tr>
<td>More than 650 kWh</td>
<td>1,79</td>
</tr>
</tbody>
</table>

What will the electricity bill (without VAT) be for a month in which a household uses 600 kWh of electricity?

[1] R996,00
[2] R2 693,52
[3] R920,02
[4] R1 072,52

END OF ASSIGNMENT 01 OF SEMESTER 1
Important:

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- Always keep your detailed workings in a file so that you can compare your solutions to the ones that will be published on the module site on myUnisa after the due date. *Also, keep a copy of the options you have chosen, in case of a query.*
- The due date of this assignment is **fixed**. No extension can be granted because the solutions are posted on the BNU1501 module site shortly after the closing date.

**Question 1**

Consider the sketch below. Calculate the perimeter of the shaded part of the figure.

![Figure](image)

[1] 104.75 cm
[2] 64.47 cm
[3] 76.47 cm
[4] 142.77 cm
Question 2
Refer to the sketch in question 1 above.
Calculate the area of the shaded region.

[1] 238,94 cm\(^2\)
[2] 142,77 cm\(^2\)
[3] 397,23 cm\(^2\)
[4] 241,73 cm\(^2\)

Question 3
A plastic rectangular container with a length of 40 cm, a breadth of 30 cm and a height of 10 cm contains 12 identical cans each with a diameter of 10 cm and a height of 10 cm. The remaining space is filled with cold water to keep the cans cool. How much water is required in litres?

[1] 10,06 ℓ
[2] 25,70 ℓ
[3] 11,21 ℓ
[4] 2,58 ℓ
Question 4
A rectangular glass tank is half filled with water. The measurements of the tank are given in the diagram below. By how much, in terms of centimetres, will the water level rise if a solid cylindrical piece of iron, with a diameter of 6 cm and a length of 10 cm, is dropped into the water? The answer, rounded to two decimal digits, is ...

![Diagram of rectangular glass tank and cylindrical piece of iron]

[1] 0.57 cm
[2] 0.28 cm
[3] 2.26 cm
[4] 0.38 cm

Question 5
Suppose a circular fish pond has to be sealed on the inside. The diameter of the pond is 3 metres and the depth is $1\frac{1}{2}$ metres. One litre of sealer covers 3 square metres. How many two-litre tins of sealer have to be purchased to complete the sealing job?

[1] 8
[2] 7
[3] 3
[4] 4
**Question 6**

In the diagram below, we have a circle with centre $M$ and a diameter of 80 mm. There is a right-angled triangle inside the circle with two vertices on the circumference of the circle, and the third vertex at the origin $M$. The shaded area in the diagram, rounded to one decimal digit, is ...

![Diagram of a circle with a right-angled triangle inside it]

[1] 38.9 cm$^2$
[2] 4.2 cm$^2$
[3] 42.3 cm$^2$
[4] 169.1 cm$^2$

**Question 7**

Solve the following equation:

$$2(2y - 1) - 3y = 4 - y$$

[1] $y = \frac{5}{2}$
[2] $y = 3$
[3] $y = 0$

**Question 8**

Solve for $x$ in the following equation:

$$\frac{2x}{5} - \frac{1}{2} = \frac{x}{5}$$

[1] $x = 2\frac{1}{2}$
[2] $x = \frac{5}{6}$
[3] $x = \frac{2}{5}$
[4] $x = -\frac{5}{6}$
Question 9
If \( F = \frac{9}{5}C + 32 \), make \( C \) the subject of the formula.

[1] \( C = \frac{5F - 32}{9} \)
[2] \( C = \frac{5F}{9} + \frac{160}{9} \)
[3] \( C = \frac{5}{9}F - \frac{160}{9} \)
[4] \( C = \frac{5F + 32}{9} \)

Question 10
If \( V = \ell \times b \times h \), make \( h \) the subject of the formula.

[1] \( h = V - \ell - b \)
[2] \( h = \frac{V}{\ell \times b} \)
[3] \( h = V \times \ell \times b \)
[4] \( h = \frac{\ell \times b}{V} \)

Question 11
Determine the equation of the straight line that passes through points (3; -2) and (5; -6).

[1] \( y = -4x + 14 \)
[2] \( y = 2x - 8 \)
[3] \( y = 2x - 4 \)
[4] \( y = -2x + 4 \)

Question 12
Braun invested R8 350 in an account that pays simple interest. After six years, he received an accumulated amount of R12 859. The simple interest rate on the investment, rounded to two decimal digits, was ...

[1] 9.00%  
[2] 7.45%  
[3] 6.00%  
[4] 0.09%
Question 13
Determine the amount that has to be invested now, to be worth R10 000 in 8 months' time, if the annual simple interest rate is 9.75%.

[1] R9 389.67  
[2] R9 398.61  
[3] R1 333.33  
[4] R6 060.61

Question 14
Helen needs R20 000 in three years' time. What is the least amount that she should deposit now into an account that offers an annual interest rate of 15%, compounded every 3 months, to have the required amount by then? The answer, to the nearest rand, is ...

[1] R13 793  
[2] R12 858  
[3] R19 910  
[4] R12 892

Question 15
How much, to the nearest rand, can Lerato borrow from a bank if she can repay the loan by means of quarterly payments of R2 000, starting at the end of the first quarter? The interest rate is 18% per annum, compounded quarterly and the duration of the loan is 10 years.

[1] R214 061  
[2] R15 825  
[3] R36 803  
[4] R17 504

Question 16
Sam plans to buy a car for R125 000. He pays a 15% deposit and manages to secure a bank loan for the outstanding amount. The bank charges 12.5% per annum, compounded monthly. Determine what Sam’s minimum monthly payment will be if the loan has to be repaid in six years’ time.

[1] R998.17  
[2] R2 104.94  
[3] R2 476.40  
[4] R1 476.69
Question 17
Consider the amortisation of Sam’s loan in question 16 above. What will the outstanding amount on Sam’s loan be after 3 years’ minimum payments have been made? Assume the interest rate stayed fixed for the whole period.

[1] R103 224,20
[2] R53 125,00
[4] R74 024,78

Question 18
Consider the amortisation of Sam’s loan in question 16 above. Suppose Sam pays all minimum monthly payments on time into this loan account. In which month will the principal that is paid off in that month for the first time be more than the interest paid off?

[1] 36th month
[2] 7th month
[3] 1st month
[4] 12th month

Question 19
Consider Sam’s loan in question 16 above. Suppose Sam decides to pay R2 500 monthly into this loan account from the start. How long will it take Sam to pay off the loan?

[1] 4,7 years
[2] 3,5 years
[3] 56,4 years
[4] 14,1 years

Question 20
John wants to start saving for an apartment. On his 20th birthday, he starts depositing R500 per week into a bank account with an annual interest rate of 8%, compounded weekly. He will continue to make these weekly payments until the day of his 29th birthday. How much money will he have saved by then to finance the purchase of an apartment?

[1] R397 856,29
[2] R166 717,97
[3] R78 714,77
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**Question 1**
Round 129,3974 off to one decimal digit.

[1] 129,3
[2] 130,0
[3] 129,4

**Question 2**
Round 129,3974 off to two decimal digits.

[1] 129,40
[2] 129,39
[3] 129,30
[4] 129,49

**Question 3**
Round 129,3974 off to an integer.

[1] 130
[2] 129,4
[3] 120
[4] 129
Question 4
A chocolate costs half as much as an ice cream. Suppose the chocolate costs $c$ rand. How much does the ice cream cost, in terms of $c$?

[1] $2x$ rand
[2] $2c$ rand
[3] $\frac{c}{2}$ rand
[4] $c + 2$ rand

Question 5
Refer to question 4 above.
Suppose Susan wants to buy both a chocolate and an ice cream for both herself and a friend. How much will they cost her?

[1] $(c + 2c)$ rand
[2] $2 \left( c + \frac{c}{2} \right)$ rand
[3] $2c$ rand
[4] $(2c + 4c)$ rand

Question 6
Refer to questions 4 and 5 above.
How much change will Susan get if she pays with a 100 rand note for the chocolates and ice creams that she wants to buy for herself and her friend? (Assume the chocolates and ice creams cost less than R100.)

[1] $(100 - c - 2c)$ rand
[2] $(100 - 2c + 4c)$ rand
[3] $(100 - 2c - 4c)$ rand
[4] $(100 - c + 2c)$ rand

Question 7
A family wants to attend a concert. The admission fee is R50 for an adult and R20 for a child. Suppose the family consists of two parents and $x$ children. How much will the outing cost the family, in terms of $x$?

[1] $70x$ rand
[2] $(2 + x) 70$ rand
[3] $120x$ rand
[4] $(100 + 20x)$ rand
Question 8
Stewart cycles at an average speed of 10 kilometres per hour. What is the minimum number of days that it will take him to travel 1 000 kilometres, if he cannot cycle for more than 8 hours per day?

[1] 12.5 days
[2] 100 days
[3] 150 days
[4] 80 days

Question 9
Suppose $q$ loaves of bread cost $c$ rand. Write an expression, in terms of $q$ and $c$, for the amount that 5 loaves of bread will cost.

[1] $5qc$ rand
[2] $\frac{5c}{q}$ rand
[3] $\frac{5q}{c}$ rand
[4] $\frac{c}{5q}$ rand

Question 10
Simplify the following expression as far as possible:

$$ab + a^2b + 3b^2a + 2a^2 + ba$$

[1] $8a^2b^2$
[2] $2ab + 6a^2b$
[3] $2ab + 3a^2b + 3ab^2$
[4] $2a^2b^2 + 3a^4b^2 + 3b^2a$

Question 11
Simplify the following expression as far as possible:

$$\sqrt{16a^{16}b^{36}}$$

[1] $8a^8b^{18}$
[2] $4a^4b^6$
[3] $8a^4b^6$
[4] $4a^8b^{18}$
Question 12
Simplify the following expression as far as possible:

\[6x^2 - y(9x + 2y) - 3(xy - y^2)\]

1. \[6x^2 - 12xy - y^2\]
2. \[-12xy - 5y^2 + 6x^2\]
3. \[6x^2 - 12xy + y^2\]
4. \[-12xy + y^2 - 2y + 6x^2\]

Question 13
Simplify the following expression as far as possible:

\[9x^3y^2 \div 3x^2y^3 \times (2xy^2)^3\]

1. \[18x^4y^5\]
2. \[24x^4y^5\]
3. \[18x^4y^4\]
4. \[24x^5y^4\]

Question 14
Write \(3\frac{3}{7}\) as an improper fraction.

1. \(\frac{24}{7}\)
2. \(\frac{9}{7}\)
3. \(\frac{9}{7}\)
4. \(\frac{6}{7}\)

Question 15
Write \(\frac{68}{7}\) as a mixed fraction.

1. \(\frac{7}{9}\)
2. \(\frac{9}{9}\)
3. \(\frac{9}{9}\)
4. \(\frac{7}{9}\)

Question 16
Determine the LCM (Lowest Common Multiple) of the following three numbers:

8, 14 and 12

1. 336
2. 1,344
3. 14
4. 168
Question 17
Determine the LCM of the following three terms:

\[ ab, a^3b^2 \text{ and } a^2b^3 \]

[1] \( ab \)
[2] \( a^6b^6 \)
[3] \( a^3b^3 \)
[4] \( a^5b^5 \)

Question 18
Determine the LCM of the following three terms:

\[ 4x^2y^2, 16x^2y^3 \text{ and } 14x^3y^2 \]

[1] \( 224x^7y^7 \)
[2] \( 896x^2y^3 \)
[3] \( 112x^3y^3 \)
[4] \( 112xy \)

Question 19
Simplify the following expression as far as possible without using a calculator:

\[ \frac{2}{3} - \frac{1}{6} + \frac{3}{5} \]

[1] \( 2 \)
[2] \( -\frac{7}{10} \)
[3] \( 1\frac{13}{30} \)
[4] \( 1\frac{1}{10} \)

Question 20
Simplify the following expression as far as possible without using a calculator:

\[ \frac{3}{4} \div \frac{2}{9} \times \frac{1}{2} \]

[1] \( 6\frac{1}{4} \)
[2] \( \frac{1}{12} \)
[3] \( 1\frac{11}{16} \)
[4] \( \frac{4}{7} \)
Question 21
Simplify the following expression as far as possible without using a calculator:

\[
\frac{5}{2} \div \frac{9}{8} - \frac{4}{3}
\]

[1]  -12
[2]  \frac{8}{9}
[3]  1\frac{23}{48}
[4]  3\frac{2}{13}

Question 22
Simplify the following expression as far as possible without using a calculator:

\[
\frac{2}{3b} + \frac{5}{4b}
\]

[1]  \frac{1}{b}
[2]  \frac{23}{12}
[3]  \frac{1}{b^2}
[4]  \frac{23}{12b}

Question 23
Write \(\frac{5}{7}\) as a decimal number, rounded to three decimal digits, without using a calculator.

[1]  0,714
[2]  5,700
[3]  0,715
[4]  1,400

Question 24
Write 0,125 as an ordinary fraction in its simplest form.

[1]  \(1\frac{1}{4}\)
[2]  \(1\frac{3}{4}\)
[3]  \(\frac{1}{8}\)
[4]  \(\frac{1}{80}\)
Question 25
Write $2\frac{3}{7}$ as a decimal number, rounded to three decimal digits, without using a calculator.

[1] 2.370
[2] 2.429
[3] 2.428
[4] 0.429

Question 26
Write 3,675 as an ordinary mixed fraction in its simplest form.

[1] $3\frac{27}{40}$
[2] $3\frac{3}{8}$
[3] $\frac{27}{32}$
[4] $3\frac{3}{4}$

Question 27
Simplify the following expression as far as possible:

$$3 \cdot 2^3 + 2^3 \cdot 3^2$$

[1] 46,872
[2] 7,800
[3] 91
[4] 96

Question 28
I have 20 apples and 10 oranges in a basket. If I take 4 apples out of the basket, what is the ratio of the number of oranges to the number of apples in the basket?

[1] 8 : 5
[2] 1 : 2
[3] 5 : 8
[4] 10 : 3

Question 29
Three students, Phumelo, Ivan and John, painted a hall together. They are each paid the same rate per hour. Phumelo spent 4 hours on the job, Ivan 3 hours, and John 1 hour. They earned R2,000 in total for the job. How much should Ivan receive?

[1] R1,000
[2] R750
[3] R250
[4] R600
Question 30

The increasing block tariffs per month for residential water for the 2016/2017 financial year are given below:

<table>
<thead>
<tr>
<th>Household water in kilolitres (kℓ)</th>
<th>Rand per kℓ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 kℓ (±200 ℓ per day)</td>
<td>8.66</td>
</tr>
<tr>
<td>7-12 kℓ</td>
<td>12.36</td>
</tr>
<tr>
<td>13-18 kℓ</td>
<td>16.23</td>
</tr>
<tr>
<td>19-24 kℓ</td>
<td>18.78</td>
</tr>
</tbody>
</table>

These tariffs do not include VAT.

What is the water bill, excluding VAT, for a month in which a household uses 10 kℓ of water?

[1] R101.40
[3] R123.60
[4] R105.10

END OF ASSIGNMENT 01 OF SEMESTER 2
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**Question 1**

Consider the sketch below.
A rectangular piece of material with sides of 120 cm and 100 cm is used to make a circular (round) table cloth. The diameter of the completed cloth must be 0.9 m, and 5 cm has to be provided for the hem. How much material, in square metres, is wasted?

![Diagram of a rectangular piece of material with dimensions 120 cm x 100 cm and a circle with a diameter of 0.9 m]  

[1] 0.56 m$^2$  
[2] 1.16 m$^2$  
[3] 0.41 m$^2$  
[4] 1.34 m$^2$
Question 2

Consider the sketch below.
A semicircle is drawn inside a triangle as indicated in the sketch. The side lengths of the triangle are 30 cm, 40 cm and 50 cm, respectively. Calculate the perimeter of the shaded part.

[1] 131,42 cm
[2] 442,92 cm
[3] 162,83 cm
[4] 147,12 cm

Question 3

Refer to the sketch in question 2 above. Calculate the area of the shaded part in the sketch.

[1] 442,9 cm²
[2] 285,8 cm²
[3] 1 042,9 cm²
[4] 842,9 cm²
**Question 4**

A circular glass fish tank is three quarters filled with water. The measurements of the fish tank are given in the sketch below. Suppose a solid rectangular glass block with a length and width of 30 cm and a height of 10 cm, is afterwards put in the centre of this fish tank. By how many centimetres will the water level in the tank rise? The answer, rounded to two decimal digits, is...

![Fish tank and block](image)

[1] 0,78 cm 
[2] 3,18 cm 
[3] 7,16 cm 
[4] 1,59 cm

**Question 5**

Calculate the volume of the smallish container in the figure below. It is a rectangular box with a curved lid, that is a cylinder sliced down the middle. The measurements of the container are given in the sketch. The volume of the container is...

![Container](image)

[1] 229 cm³ 
[2] 631 cm³ 
[3] 731 cm³ 
[4] 983 cm³
Question 6
Refer to the sketch in question 5 above.
Suppose you want to paint the outside of the lid of the container red. Fifty millilitres of the red paint will cover 10 cm$^2$. How many litres of red paint will you need to finish this painting job? (Hint: First calculate the area to be painted red.) The answer to one decimal digit, is ....

[1] 1,4 ℓ  
[2] 0,2 ℓ  
[3] 2,3 ℓ  
[4] 0,9 ℓ  

Question 7
Solve the following equation:

$$2 (3a + 1) = 7 - 4a$$

[1] $a = \frac{9}{17}$  
[2] $a = \frac{3}{4}$  
[3] $a = \frac{1}{2}$  
[4] $a = \frac{9}{2}$  

Question 8
Solve the following equation:

$$\frac{3x}{4} + 2 \frac{1}{2} = 2x$$

[1] $x = 2$  
[2] $x = \frac{1}{2}$  
[3] $x = -10$  
[4] $x = \frac{2}{5}$  

Question 9
If $p = m^2 - \frac{m}{2}$, make $x$ the subject of the formula.

[1] $x = \frac{m^2}{2} - \frac{p}{2}$  
[2] $x = 2m^2 - 2p$  
[3] $x = 2m - 2\sqrt{p}$  
[4] $x = 2p - 2m^2$
Question 10

If \( V = \pi r^2 h \), make \( h \) the subject of the formula.

[1] \( h = V - \pi r^2 \)

[2] \( h = V \pi r^2 \)

[3] \( h = \frac{V}{2\pi r} \)

[4] \( h = \frac{V}{r^2 \pi} \)

Question 11

The straight line passing through points (3; 2) and (0; 5) is ...

[1] an ascending line.


Question 12

Determine how many years it will take for R24 000 to grow to R36 000 if it is invested at an annual simple interest rate of 12,5%.

[1] 3,4 years

[2] 2,7 years

[3] 4 years

[4] 6,25 years

Question 13

Determine what the annual interest rate was if the simple interest earned on an investment of R150 000 was R25 000. The R150 000 was invested for three and a half years. The answer, rounded to the first decimal digit is ...

[1] 0,5%

[2] 4,8%

[3] 4,4%

[4] 1,43%

Question 14

How long will it take for an investment to double in value if the annual interest rate is 10% and interest is compounded every 6 months? The answer, correct to one decimal digit, is ...

[1] 14,2 years

[2] 21,0 years

[3] 2,3 years

[4] 7,1 years
Question 15
What should the annual interest rate, compounded daily, be for an investment of R8 000 to earn R3 000 interest in three years’ time?

[1] 12.5%
[2] 32.7%
[3] 10.6%
[4] 11.2%

Question 16
Malibongwe wants to start saving to be able to buy a car in 5 years’ time. He wants to save by depositing weekly payments of R1 250 into a savings account that offers an annual interest rate of 24%, compounded weekly. How much will Malibongwe have available for a car, in 5 years’ time?

[1] R625 885.97
[2] R189 034.39
[3] R325 000
[4] R75 987

Question 17
Brenda secured a 20-year loan of R400 000. She repays the loan in equal monthly payments. The annual interest rate is 16%, compounded monthly. What is Brenda’s minimum monthly payment?

[1] R231.69
[2] R5 565.02
[3] R1 666.67
[4] R5 622.23

Question 18
Consider the amortisation of Brenda’s loan in question 17 above. What will the outstanding balance be after all the minimum payments have been made for 15 years? Assume the interest rate stayed fixed for the whole period.

[1] R228 843.24
[2] R375 000.00
[3] R0.00
[4] R396 180.76
Question 19
Consider the amortisation of Brenda’s loan in question 17 above. Suppose Brenda can only afford to make the minimum monthly payments into this loan account. After how many years, to the nearest month, will the Principal which is paid off in a month, for the first time be more than the interest paid off per month?

[1] 10 years and 1 month
[2] 15 years and 2 months
[3] 15 years and 8 months
[4] 20 years

Question 20
Refer to Brenda’s loan in question 17 above. Suppose Brenda decides from the start to pay R6 000 per month into this loan account. In how many years will she pay off the loan?

[1] 41,5 years
[2] 13,8 years
[3] 165,9 years
[4] 5,6 years

END OF ASSIGNMENT 02 OF SEMESTER 2

END OF TUTORIAL LETTER