

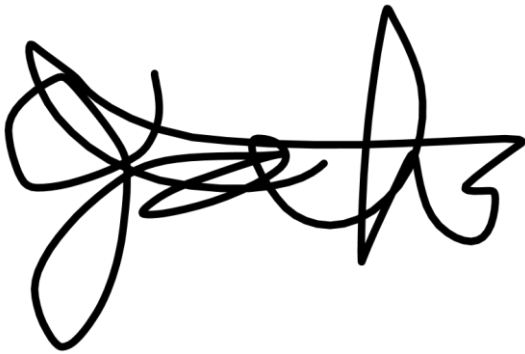
Occupational Certificate: Software Engineer (NQF5) Fundamentals of Software Engineering Mathematics (FSEM)	
Curriculum Code	251201001
SAQA Qualification ID	119458
Intake / year	2-2025
Assessment Name	Summative Assessment
Module NQF Level	5
Credits	15
Open date and time	12 December 2025 • Section A: 17:15 • Section B: 18:45
Close date and time	12 December 2025 • Section A: 18:45 • Section B: 20:15
Assessment Total Marks	Section A = 50 (20% of total mark percentage) Section B = 45 (30% of total mark percentage)
Pass percentage	65%

Lecturer Information	
Lecturer	Daniel van Deventer
Lecturer E-mail	danield@aie.ac

IMPORTANT NOTICE

Before submitting your assessment, please ensure that it is signed and that all your personal details are accurately filled in the designated space below (Section in red). Work will not be accepted unless the required sections below are fully completed prior to submission, resulting in a 0% grade for this assessment.

The signature must be your valid handwritten signature and NOT your name and surname typed in the space provided.

Student Number:	461476		
Student name and surname:	John Herbst	Date:	12/12/2025
Student cell phone number:	0604944665		
Student Signature:			
Lecturer name and surname:	Daniel van Deventer	Date:	12/15/25
Lecturer Signature:	DvD		
Assessor name and surname:		Date:	
Assessor Signature:			
Moderator name and surname:		Date:	
Moderator Signature:			

Instructions to Candidates

1. Read each question carefully.
2. You must answer Section B below the space provided named "STUDENTANSWER". Once completed, the answer sheet, with your answers, must be converted to PDF and uploaded to the student portal. Make sure that all additional information is uploaded in a single Zipped folder.
3. QCTO students who achieve between 55-64% may have a further submission opportunity, subject to the departmental rules.
4. **NO LATE submissions will be accepted. (System will automatically close when due date and time is reached). If you encounter any difficulty with the student portal, immediately take a screenshot, log a ticket (attention support), and attach your assessment to the ticket.**
5. You must follow the departmental formatting guidelines.
6. You must write your name, surname, and student number on your script. A failure to do so will result in your script not being marked.
7. By submitting your answer sheet for marking, you declare the following:
 - a. You are familiar with the AIE's policies on academic dishonesty and plagiarism;
 - b. Your submitted is your own original work. Where you have made use of someone else's work, you have duly referenced such work making using of the APA style of referencing;
 - c. You have not allowed, and will not allow any other student to copy your work; and
 - d. You did not copy the work of another student.
8. Students that are dishonest will be subjected to disciplinary procedures.

Assessment Objective/s:

The Summative assessment (Section A and B) will cover the following assessment topics:

No	KM/KT number	KT Description
1.	KM05-KT0101	Basic Algebra
2.	KM05-KT0102	Analytical Geometry
3.	KM05-KT0103	Calculus
4.	KM05-KT0104	Exponents and Logarithms
5.	KM05-KT0105	Basic Statistics and Probability
6.	KM05-KT0106	Equations and Graphs
7.	KM05-KT0107	Linear Programming
8.	KM05-KT0108	Inequalities

Scope:

The primary aim of this module is to provide you with an understanding of basic mathematical principles and their direct application within software engineering. From algebra to calculus, and statistics to linear programming, you will explore how mathematical concepts underpin many aspects of software development, enhancing your analytical skills and problem-solving capabilities.

Technical Aspects:

Please verify that all pages are included when downloading this assessment by checking the page numbers at the bottom of the document.

Ensure the following font and size is used in this assessment

- Font: Arial
- Size: 12
- Font colour: Black

Save and upload the report as a .PDF (**No backgrounds**) with the following naming convention:

- Student no_StudentName_ StudentSurname_ModuleCode_SA1

Mark allocation for report

See Mark allocation sheet below

Question 1

(11)

<i>KM No</i>	<i>KT No</i>	<i>KT Description</i>
<i>05</i>	<i>0101</i>	<i>Sets</i>

- a) Define a set and provide two examples of finite sets and two examples of infinite sets. [11]

ANSWER

A Set is a organized collection of objects. It can be written in different forms.

A Finite set has a ending. $A = \{1, 2, 3, 4, 5\}$ $B = \{2, 4, 6, 8, 10\}$

A Infinite set does not have a ending $A = \{1, 2, 3, 4, 5, \dots\}$ $B = \{2, 4, 6, 8, 10, \dots\}$

Question 2

(15)

<i>KM No</i>	<i>KT No</i>	<i>KT Description</i>
05	0601	Solving Equations

a) Solve the following linear equations:

- a. $3x - 5 = 10$
- b. $5x + 3 = 18$
- c. $4x + 9 = 25$
- d. $6x - 12 = 0$
- e. $7x + 14 = 42$

[3]

[3]

[3]

[3]

[3]

ANSWER

a. $3x - 5 = 10$
 $3x = 15$
 $x = 5$

b. $5x + 3 = 18$
 $5x = 15$
 $x = 3$

c. $4x + 9 = 25$
 $4x = 16$
 $x = 4$

d. $6x - 12 = 0$
 $6x = 12$
 $x = 2$

e. $7x + 14 = 42$
 $7x = 28$
 $x = 4$

Question 3

(4)

<i>KM No</i>	<i>KT No</i>	<i>KT Description</i>
--------------	--------------	-----------------------

05	0102	Sequence and Series
----	------	---------------------

- a) What is the difference between arithmetic and geometric sequences? [4]

ANSWER

Arithmetic has a common difference which we call: d .

Geometric has a Common ratio which we call: r .

Arithmetic's Growth stays the same, Whereas geometric the growth becomes bigger every step.

Question 4 (6)

KM No	KT No	KT Description
05	0501	Basic Statistics

- a) Compare the mean, median, and mode as measures of central tendency. [6]

ANSWER

The mean is the Average of observed outcomes.

The median is the middle point of the data.

The mode is the most common outcome.

I would say the mean is the best central tendency because it can give a broad idea of what is going on, second to that I would say is the mode it shows what is the most common outcomes, Lastly is the median because it gets bothered by the outliers.

Question 5 (5)

KM No	KT No	KT Description
05	0701	Maximization and Minimization

- a) How is linear programming used to solve optimisation problems in software [5]
engineering? Provide three (3) application examples.

ANSWER

Linear programming is the problem of maximizing or minimizing a linear function that is subjected to linear constraints. This can be inequalities or equalities helps to find the feasible region and optimize the solution in order to have the highest and lowest value of the function.

$$4y + 12 > 12x$$

$$4y + 12 - 12 > 12x - 12$$

$$4y > 12x - 12$$

$$y > 3x - x$$

Question 6

(4)

<i>KM No</i>	<i>KT No</i>	<i>KT Description</i>
<i>05</i>	<i>0202</i>	<i>Vectors</i>

- a) Define a vector and explain its two main properties.

[4]

ANSWER

A vector is a mathematical object with magnitude and direction.

It goes in a certain direction and has a certain size which is usually measured in centimeters, millimeters and kilometers.

The direction is measured in degrees.

We can use horizontal and vertical parts to calculate them also known as x and y.

When we break a vector up like that its called an component.

Mark allocation for student		
Question	Maximum Mark	Learner mark
Question 1.a	11	11
Question 2.a	15	15
Question 3.a	4	4
Question 4.a	6	6
Question 5.a	5	5
Question 6.a	4	4
Total:	45	45

STUDENT ASSESSMENT FEEDBACK

Qualification Name:	Occupational Certificate: Software Engineer (NQF5)
Qualification SAQA Number:	119458
Subject Name:	Fundamentals of Software Engineering Mathematics
Subject Code:	FSEM
Assessment Name:	Summative Assessment
Assessment Code:	FSEM_SA

Assessment Decision	Competent		Not yet competent	
----------------------------	------------------	---	--------------------------	--

Feedback report	1st Attempt		2nd Attempt	
	C	NYC	C	NYC
Unit standard Number(s)				
KM08	C			
KT0101				
KT0102				
KT0103				
KT0104				
KT0105				
KT0106				
KT0107				
KT0108				

General feedback to learner Supply comprehensive feedback why learner is found NYC