Logo, company name

Description automatically generated

**NAME:**

**11AEMAM Test 7 2021**

**Section 1: /**

**Section 2: /**

**Total: /**

**%**

**TIME ALLOCATION FOR THIS TEST: 50 minutes**

**Section 1 – No Calculators Allowed.**

**minutes reading time: 2 minutes**

**minutes working time: 20 minutes**

**Section 2 – Calculators allowed**

**minutes reading time: 3 minutes**

**minutes working time: 34 minutes**

**Material required/recommended for this test**

**To be provided by the supervisor**

Question/answer booklets for Sections One and Two.

SCSA 11AEMAM Formulae Sheet

**To be provided by the candidate**

***Section One:***

Standard items: pens, pencils, pencil sharpener, highlighter, eraser, ruler

*Special materials: drawing instruments, templates, no notes, formula sheet*

Section Two:

Standard items: pens, pencils, pencil sharpener, highlighter, eraser, ruler

*Special materials: drawing instruments, templates, notes on a maximum of one unfolded sheet of A4 paper, double sided, up to three approved calculators, CAS, graphics, or scientific.*

**Important note to candidates**

No other items may be taken into the test room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the test room. If you have any unauthorised material with you, hand it to the teacher **before** reading any further.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section** | **Reading Time** | **Working time** | **Marks** | **Score** |
| **Resource free** | **2 minutes** | **20** | **21** | **%** |
| **Resource rich** | **3 minutes** | **34** | **34** | **%** |
| **Total** | **5 minutes** | **54** | **55** | **%** |

**SECTION 1 CALCULATOR FREE: 20 MINUTES**

**QUESTION 1 (4 marks)**

Write down the first four terms of the sequence defined by:



1. (2 marks)
2.  and  (2 marks)



**QUESTION 2** **(5 marks)**

An arithmetic sequence is described by the rule: , where 

1. Find the first three terms of the sequence (3 marks)



1. State the recursive rule for this sequence (2 marks)



**QUESTION 3** **(4 marks)**

If and , find the first term and the common difference, given the terms are from an arithmetic progression.



Question 4 (8 marks)



The first three terms, in order, of a sequence are and .

Determine the fourth term of the sequence if

(a) the sequence is arithmetic. (4 marks)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ equates differences   solves for   states   correct |

(b) the sequence is geometric. (4 marks)

|  |
| --- |
|  |
| **Specific behaviours** |
| ✓ equates ratios   solves for   states   correct |

**END OF SECTION ONE**

Logo, company name

Description automatically generated**Calculator Assumed Section** Name: …………………………………

Reading time: 3 minutes

Working time: 34 minutes Marks: 34

Question 5 (4 marks)

Given the sequence 6, 10, 14, 18, 22, …

1. Determine the sum of the first twenty terms (2 marks)

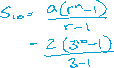
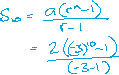


1. Does the number 624 belong in this sequence? (2 marks)



Question 6 (6 marks)

1. The first term of geometric sequence is 2, and the fifth term is 162. (4 marks)  
   Find the sum of the first 10 terms.



1. If are consecutive terms of geometric sequence, find . (2 marks)



Question 7 (3 marks)

A hiker sets out on a 100km hike. She walks 36km on the first day and that distance on the second. Every day thereafter she walks of the distance she walked on the day before.

Will the hiker cover the distance of 100km to complete the walk and if so, on what day will she complete the task?



Question 8 (6 marks)

Drilling tests show that in sinking a well, the distance drilled each hour decreases by 10%. A depth of 20 metres is drilled in the first hour.

1. Find how much is drilled in the second and third hours. (2 marks)



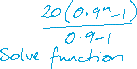
1. Explain why the distance drilled each hour will form a geometric progression. (1 mark)



1. Find the distance drilled in the 10th hour, correct to the nearest centimetre. (1 mark)



1. How long will it take to drill a depth of 100 m, correct to the nearest minute? (2 marks)



Question 9 (7 marks)

Kaya rents her house out at $300 per week. Each year she increases the weekly rent by $20.

1. Find a recursive rule for the weekly rent after years. (2 marks)



1. How long will it take for the weekly rent to double? (2 marks)



1. How many years will it take for the total rent collected to exceed $200 000? (3 marks)



Question 10 (8 marks)

Two water containers, initially empty, are being filled with water. The amount of water added to container each minute follows an arithmetic sequence, with mL poured in during the first minute and mL poured in during the second minute. The amount of water added to container each minute follows a geometric sequence, with mL poured in during the first minute and mL poured in during the second minute.

(a) The amount of water poured into container during the minute is given by . State the value of the constants and . (2 marks)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ value of   value of |

(b) Determine the total amount of water in container at the end of the minute. (2 marks)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ uses sum formula   correct amount |

(c) How long does it take to fill container with mL of water? (2 marks)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ uses sum formula   correct time |

(d) Container first holds more water than container at the end of minute .

(i) Determine the value of . (1 mark)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ correct value |



(ii) State, to the nearest mL, how much more water contains than at this time. (1 mark)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ correct value |



**End of Test**