



**MATHEMATICS METHODS Year 11**  
**Section One:**  
**Calculator-free**

\_\_\_\_\_  
Your name

\_\_\_\_\_  
Teacher's name

**Time and marks available for this section**

Reading time for this section: 3 minutes  
Working time for this section: 25 minutes  
Marks available: 25 marks

**Materials required/recommended for this section**

*To be provided by the supervisor*  
This Question/Answer Booklet  
Formula Sheet

***To be provided by the candidate***

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: nil

**Important note to candidates**

No other items may be taken into the examination 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 examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

**Instructions to candidates**

1. The rules of conduct of the CCGS assessments are detailed in the Reporting and Assessment Policy. Sitting this assessment implies that you agree to abide by these rules.
2. Write your answers in this Question/Answer Booklet.
3. Answer all questions.
4. You must be careful to confine your response to the specific question asked and to follow any instructions that are specified to a particular question.
5. Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.
6. **Show all your working clearly.** Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks. If you repeat an answer to any question, ensure that you cancel the answer you do not wish to have marked.
7. It is recommended that **you do not use pencil**, except in diagrams.

**See next page****Additional working space**

Question number: \_\_\_\_\_

Additional working space

Question number: \_\_\_\_\_

State whether the following sequences are arithmetic (A), geometric (G) or neither (N).

**Question 1** (4 marks)

(a)  $-1, 1, -1, 1, -1, 1, \dots$

(b)  $\pi, 2\pi, 3\pi, 4\pi, \dots$

(c)  $T_{n+1} = 3T_n - 1$

(d)  $T_n = 3n + 6$

**Question 2** (3 marks)

Use the infinite sum formula to express the recurring decimal  $0.\overline{27}$  as a fraction.

## Question 3

(8 marks)

Antidifferentiate with respect to  $x$  :

(a)  $\frac{dy}{dx} = \frac{1}{2}x^4$

(2 marks)

(b)  $f'(x) = (3x + 2)(x - 5)$

(2 marks)

(c)  $g'(x) = \sqrt{x}$

(2 marks)

(d)  $\frac{dy}{dx} = \frac{3}{x^2}$

(2 marks)

## Additional working space

Question number: \_\_\_\_\_

Question 8

(8 marks)

A particle is moving along in a straight line. At time  $t$  seconds its displacement  $s$  metres from a fixed point F is given by  $s = t^3 - 12t^2 + 45t + 10$ .

- (a) Find the velocity,  $v$ , in terms of  $t$ . (1 mark)

- (b) Determine when the particle is stationary. (2 marks)

- (c) Determine the average velocity during the first 6 seconds. (2 marks)

- (d) Determine the total distance travelled by the particle during the first 6 seconds. (3 marks)

Question 4

(5 marks)

Given the following sequence of numbers:

16, 12, 8, 4, 0, -4, ...

- (a) Give the explicit formula for this sequence. (1 mark)

- (b) Find the 20<sup>th</sup> term. (1 mark)

- (c) Which term of the sequence is the first to be less than -99? (3 marks)

## Question 5

(5 marks)

Determine the equation of the curve with gradient function  $f'(x) = ax + b$  where  $a$  and  $b$  are constants, given  $f(1) = 2$  and the curve has a turning point at  $(-1, 0)$ .

## Question 7

(3 marks)

The sum of the first 4 terms of a geometric sequence is 20 and the sum of the first 6 terms of the sequence is 182. Determine the tenth term of the sequence.

Additional working space

Question number: \_\_\_\_\_

Question 6 (4 marks)

A colony of rabbits on an offshore island is subjected to a controlled release of a deadly virus. The population of rabbits  $R$  on the island  $n$  months after the introduction of the virus is modelled by the pattern established in the following table.

$n$ (months)	$R$ (rabbits)
0	10 000
1	9 000
2	8 100
3	7290

(a) Write a recursive rule to represent the rabbit population  $R$  after  $n$  months. (2 marks)

(b) Find the rabbit population after 1 year. (1 mark)

(c) Determine when the number of rabbits first drops below 100. (1 mark)



## MATHEMATICS METHODS Year 11

### Section Two:

#### Calculator-assumed

Your name \_\_\_\_\_

Teacher's name \_\_\_\_\_

#### Time and marks available for this section

Reading time for this section:	2 minutes
Working time for this section:	15 minutes
Marks available:	15 marks

#### Materials required/recommended for this section

##### *To be provided by the supervisor*

This Question/Answer Booklet  
Formula Sheet (retained from Section One)

##### *To be provided by the candidate*

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: drawing instruments, templates and up to three calculators approved for use in the WACE examinations

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