

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

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

**Time and marks available for this section**  
Working time for this section: 25 minutes  
Marks available: 20 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 using a blue/black pen. Do not use erasable or gel pens.
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.

Question 1

(5 marks)

(a) Express the following in scientific notation.

(2 marks)

$$(6.3 \times 10^5) \div (3.15 \times 10^{-2})$$

$$\frac{(16y^3z)^{\frac{1}{2}}}{8\sqrt[3]{yz^{-3}}}$$

(b) Simplify the following and express with positive indices where required.

(3 marks)

See next page

**Question 2****(5 marks)**

Solve the following equations.

(a)  $\frac{1}{x^2} = 0.25$

(2 marks)

(b)  $(3^x)^2 + 6(3^x) - 27 = 0$

(3 marks)

**Additional working space**

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

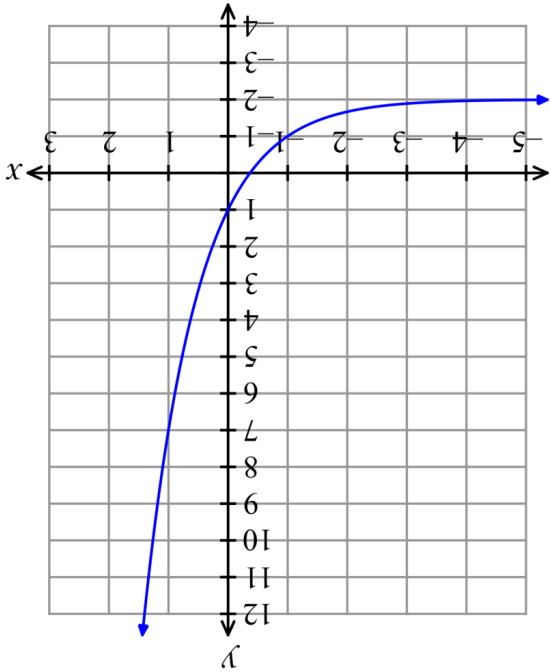
Additional working space

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

Question 3

(3 marks)

The graph of  $y = a^{x-c} + b$  is shown below.



Determine the values of the constants  $a$ ,  $b$ , and  $c$ .

See next page

## Question 4

(4 marks)

The rising water level in a storm drain after a thunderstorm is measured and given by the equation  $H = \frac{1}{8}(2^{t+1}) + 3$ , where  $H$  is the depth of the water in the storm drain in millimetres,  $t$  minutes after the thunderstorm began.

- (a) Determine the depth of the water 2 minutes after the thunderstorm began.  
(1 mark)

- (b) Determine the amount of time that the height of the water in the storm drain is less than 11 mm.  
(3 marks)

## Question 5

(3 marks)

The expansion of  $(2x - 1)^5$  is given by  $ax^5 + bx^4 + cx^3 + dx^2 + ex + f$ , where  $a, b, c, d, e$ , and  $f$  are constants.

Determine the value of  $d$ .