

Write your name below:

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**Hale School**

**Year 11 Semester 1 Examination, 2016**

**Mathematics
Methods**

**Circle your teacher**

**VMU MPC RPT AGC SAV BAH**

**Section Two:
Calculator-assumed

Booklet 2 of 3**

TIME ALLOWED FOR THIS SECTION

Reading time before commencing: Ten minutes
Working time for paper: One hundred minutes

**MATERIAL REQUIRED/RECOMMENDED FOR THIS PAPER**

*TO BE PROVIDED BY THE SUPERVISOR*

**TWO** Question/Answer booklets for Section Two – complete BOTH.

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, notes on two unfolded sheet of A4 paper, and
 calculators approved for use.

**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. Please check carefully, and if you have any unauthorised material with you, hand it to the supervisor **BEFORE** reading any further.

**STRUCTURE OF THIS PAPER**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section | Number of questions available | Number of questions to be answered | Working time (minutes) | Marks available | Percentage of exam |
| Section One:Calculator-free | 8 | 8 | 50 | 53 | 37 |
| Section Two:Calculator-assumed | 13 | 13 | 100 | 90 | 63 |
|  |  | **Total** | 100 |

**INSTRUCTIONS TO CANDIDATES**

1. Write your answers in this Question/Answer Booklet.
2. You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.
3. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

● Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.

 ● Continuing an answer: If you need to use the space to continue an answer, indicate
 in the original answer space where the answer is continued, i.e. give the page number.

Fill in the number of the question that you are continuing to answer at the top of the page.

1. 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 any question, ensure that you cancel the answer you do not wish to have marked.
2. It is recommended that you do not use pencil, except in diagrams.

Section Two: Calculator Assumed 90 marks (63%)
This section has 13 questions. Answer all questions. Write your answers in the spaces provided.
Working time: 100 minutes
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question 9 9 marks**

In a school of 160 Year 11 students, 100 study Music, 80 study Accounting and 50 study neither subject.

 a. Complete the Venn diagram below. (2 marks)

Accounting

 Music

 b. How many students study both subjects? (1 mark)

 c. Hence determine the **probability** that a randomly selected student studies:

1. at most one of the two subjects (1 mark)
2. Music but not Accounting (1 mark)
3. Music if he/she studies Accounting (2 marks)
4. Accounting given he/she studies Music (2 marks)

**Question 10 7 marks**

ABCD is a square with A(-2, 4) and B(10, -1).

Space for diagram.

1. What is the gradient of AB? (2 marks)
2. What is the equation of the line that makes the side AD? (3 marks)
3. If the midpoint of the diagonal AC is (6.5, 7.5) what are the co-ordinates of the
 point C? (2 marks)

**Question 11 6 marks**

1. Given that  and , find the exact value for . (3 marks)

b. Determine α correct to 1 decimal place. (3 marks)

 Note : The diagram is not to scale.

 F

 28°

 16 cm

 α H

 G 12 cm

**Question 12 9 marks**

1. The graph of is shown on each graph below. Neatly sketch and label the following functions on each graph. (6 marks)

|  |  |
| --- | --- |
|  |  |
| 1.

 |  |

 **Question 12 continued**

1. Describe in order the transformations required to change the graph of  into the graph of  (3 marks)

**Question 13 4 marks**

A ground search for a lost hiker is being organised using three camping sites in a national park as bases. It is known that the hiker is within the triangular area formed with the three campsites as vertices. Campsite A is 15km due east from campsite B. Campsite C is on a bearing of 170o from campsite A (hint : ). Campsite B is 20km from campsite C. Note : The diagram is not to scale.

 B 15 km A

 20 km

 C

Calculate the area of the search to the nearest square kilometre.

**Question 14 5 marks**

Solve the following equation using algebraic techniques and giving exact answers.

 

**Question 15 5 marks**

The equation  represents a circle.

1. Using algebra find the coordinates of the centre and the length of the radius. (3 marks)
2. Find the exact coordinates of the points where the circle intersects the line .

 (2 marks)

 **END OF BOOKLET 2**

This page may be used for extra working space:

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

This page may be used for extra working space:

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