

Write your name below:

SOLUTIONS

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**Hale School**

**Year 11 Semester 1 Examination, 2017**

**Mathematics   
Methods**

**Circle your teacher**

**VMU MPC IFB MS SAV BAH**

**Section One:  
Calculator-free**

**Booklet 1 of 3**

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53

TIME ALLOWED FOR THIS SECTION

Reading time before commencing: Five minutes  
Working time for paper: Fifty minutes

**MATERIAL REQUIRED/RECOMMENDED FOR THIS PAPER**

|  |  |
| --- | --- |
| **For Examiners only** | |
| Section 1 |  |
| Section 2 |  |
| Total |  |

*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. 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 | 10 | 10 | 50 | 53 | 35 |
| Section Two:  Calculator-assumed | 13 | 13 | 100 | 88 | 65 |
|  | | |  | **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 One: Calculator Free

This section has 10 questions. Answer all questions. Write your answers in the spaces provided.  
Working time: 50 minutes  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1. [1, 1, 2, 3 = 7 marks]**

Given that 

Determine and simplify:

1. 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Evaluates |

correctly

1. 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Evaluates |

1. 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Substitute  in * Simplify correctly |

1. Solve 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Sets up equation * Distribute 2 correctly * Solve |

**2. [3, 2 = 5 marks]**

Given the points and , determine algebraically:

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Find correct gradient * Find y-intercept * State correct equation |

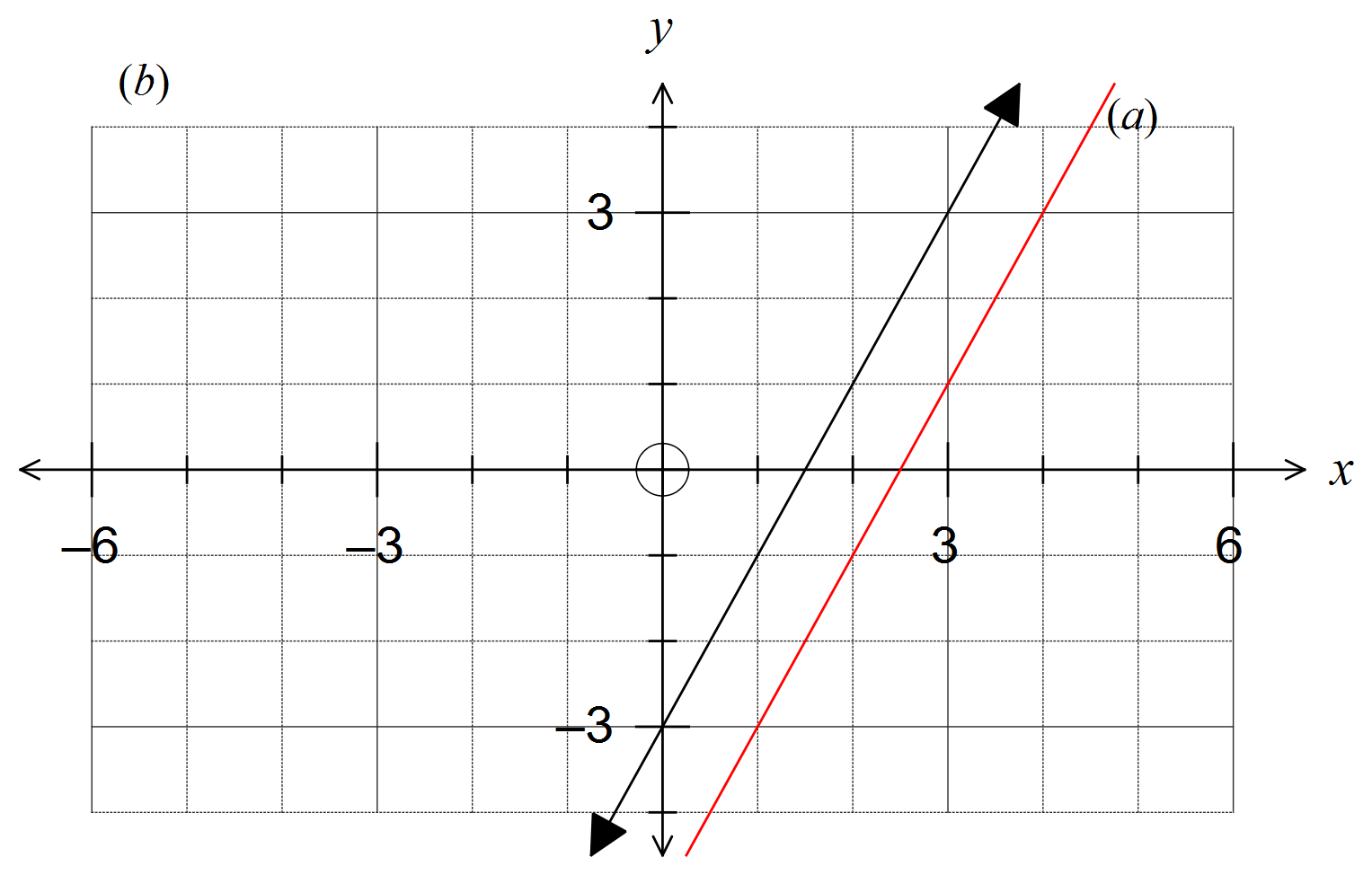
(a) the equation of the straight line that passes through the points.

(b) the midpoint of the line segment joining the points.

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Method used to calculate midpoint * States correct midpoint |

**3. [1, 2, 2 = 5 marks)**

A straight line is shown below.



1. (i) Draw on the axes above, the line parallel to the given line that passes through the

point (3, 1). Label this line (**a**).

(ii) Find the equation of the parallel line drawn in part (i).

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Find y-intercept * State correct equation |

1. Find the equation of the line that is perpendicular to the line given in the graph above  
    and passes through the point (0, 2).

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Calculate gradient * State correct equation |

**4. [2,2 = 4 marks]**

For each of the following graphs:

(a) state whether or not it is a function

(b) give the domain

Function (Yes/No) Function (Yes/No)

Domain Domain

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
| Domain 1:    Doman 2: | * State that first graph is a function * State that second graph is NOT a function * State correct Domain 1 * State correct Domain 2 |

**5. [2,2,3 = 7 marks]**

(a) Solve for **, if 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Factorises (or uses quadratic formula) * Solves |

(b) Using the Quadratic formula, solve for **, if 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Correct discriminant * Solves |

(c) Solve for **, if 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Common base * Equate indices * Solves |

**6. [2,2 = 4 marks]**

Given 

1. Determine ,  and .

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Method used to Factorises * States correct values for |

1. Fully factorise and solve 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Method used to Factorises * Correctly solves |

**7. [2,3 = 5 marks]**

Simplify the following, expressing your answer in positive indices.

1. 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Uses index laws correctly * Simplifies |

1. 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Uses index laws correctly * Uses surd laws correctly * Simplifies |

**8. [1,3 = 4 marks]**

Find the exact value of:

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
| OR | * Evaluate |

* 1. 

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Correct exact values * Simplify numerator and denominator correctly * Correct answer |

* 1. 

**9. [1,3 = 4 marks]**

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Determines the correct reference angle |

1. If  find  in radians for …

|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Determines correct reference angle. * States all solutions for the domain and reference angle. |

1. if  , find  for 

**10. [3,5 = 8 marks]**

1. If , and , then give the exact value for



|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * Expand  and * Method used(simultaneous equations) to simplify equations * Finds correct exact value |

1. Given that  and , where A and B are acute, find the exact value of:



|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * States correct hypotenuse value * States correct cosine value |



|  |  |
| --- | --- |
| **Solution** | **Specific Behaviours** |
|  | * States correct  value * Use sum difference method correctly * Simplifies correctly |

**END OF SECTION ONE**

This page may be used for extra working space:

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

This page may be used for extra working space:

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

This page may be used for extra working space:

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