# Rossmoyne Senior High School

### Year 12 Trial WACE Examination, 2014

### Question/Answer Booklet

**SOLUTIONS**

# MATHEMATICS 2A/2B

## Section One:

## Calculator-free

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Student Number: In figures |  |  |  |  |  |  |  |  |

 In words

 Your name

## Time allowed for this section

Reading time before commencing work: five minutes

Working time for this section: fifty minutes

## 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, pencils, pencil sharpener, eraser, correction fluid/tape, ruler, highlighters

Special items: nil

## Important note to candidates

No other items may be used in this section of the examination. 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.

## 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 | 7 | 7 | 50 | 50 | 33⅓ |
| Section Two:Calculator-assumed | 13 | 13 | 100 | 100 | 66⅔ |
|  | **Total** | 150 | 100 |

## Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2013*. Sitting this examination implies that you agree to abide by these rules.
2. Write your answers in the spaces provided in this Question/Answer Booklet. 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(s) 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 an answer to 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 (50 Marks)

This section has**seven (****7)** questions. Answer **all** questions. Write your answers in the spaces provided.

Working time for this section is 50 minutes.

Question 1 (4 marks)

Evaluate

(a)  of 200 kg. (1 mark)

150 kg

(b) 20% of $70. (1 mark)

$14

(c)  when  and . (2 marks)



Question 2 (6 marks)

(a) Simplify

(i) . (1 mark)



(ii) . (1 mark)



(b) Expand . (1 mark)



(c) Factorise . (1 mark)



(d) Expand and simplify . (2 marks)



Question 3 (6 marks)

Using the digits 2, 3, 5, 6 and 7, it is possible to make 20 different two digit numbers without using any digit more than once. The numbers are:

23, 25, 26, 27, 32, 35, 36, 37, 52, 53, 56, 57, 62, 63, 65, 67, 72, 73, 75, 76.

(a) The probability that a randomly chosen number from the above list is more than 65 is . What is the probability that a randomly chosen number is no more than 65? (1 mark)



(b) Determine the probability that a randomly chosen number from the above list

(i) starts with 6. (1 mark)



(ii) contains a 3. (1 mark)



(iii) starts with 7 or contains a 5. (1 mark)



(c) Rank the following events from least likely to most likely, when one number is chosen at random from the above list: (2 marks)

A: the number is even.

B: the number is more than 65.

C: the number is divisible by 3.

 Hence order is B, C, A.

Question 4 (10 marks)

The line  is shown on the axes below.



(a) State the -intercept of the line . (1 mark)

(0, 1)

(b) State the gradient of the line . (1 mark)

-3

(c) Does the point (8, -25) lie on the line ? Justify your answer. (2 marks)

No.



but should be -25 for point to lie on line.

Another line has equation .

(d) Complete the table of values below for the rule . (2 marks)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | -1 | 0 | 1 | 2 | 3 | 4 |
|  | **-6** | -4 | **-2** | **0** | **2** | 4 |

(e) Add the line  to the graph on the previous page. (2 marks)

(f) Use the graph to solve the simultaneous equations  and . (2 marks)



Question 5 (10 marks)

The scatterplot below shows the number of employed young persons (aged 15 to 24 years) in the Australian workforce, measured in June of each year.



(a) How many employed young persons were there in June 2003? (2 marks)

760 000

(b) There were 922 600 employed young persons in June 2014. Plot this additional data on the axes above. (1 mark)

(c) Briefly describe the trend for this time series data. (1 mark)

Number of employed is Increasing.

(d) Draw a trend line by eye over the plotted points. (2 marks)

(e) Use your trend line to estimate the number of employed young persons in

(i) June 2000. (1 mark)

705 000

(ii) June 2018. (1 mark)

1 000 000

(f) Which of the estimates in (e) do you consider the most reliable? Explain your answer.

 (2 marks)

June 2000, as it involves the least extrapolation.

Question 6 (6 marks)

The relationships in the equations, tables and graphs below are either linear or exponential.

In each case, circle the type of relationship represented by the equation, table or graph.

|  |  |
| --- | --- |
| **Linear** / Exponential | Linear / **Exponential** |
| Linear / **Exponential** | Linear / **Exponential** |
| **Linear** / Exponential | **Linear** / Exponential |

Question 7 (8 marks)

(a) Two whole numbers,  and , where , have a sum of 50 and a difference of 16.

(i) Use this information to write down two equations involving  and . (2 marks)



(ii) Determine the values of  and . (2 marks)



(b) Solve the equation . (2 marks)



(c) Solve the equation . (2 marks)



Additional working space

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

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