C:\Documents and Settings\Amy Shaw\Local Settings\Temporary Internet Files\Content.IE5\Y7YD832X\MC900154518[1].wmf **Revision Examination Assessment Papers (REAP)**

**Semester 1 Examination 2012**

**Question/Answer Booklet**

(This paper is not to be released to take home before 25/6/2012)

**MATHEMATICS 2C**

**Section One:**

**Calculator-free**

Name of Student: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Marking key\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Time allowed for this section**

Reading time before commencing work: 5 minutes

Working time for this section: 50 minutes

**Materials required/recommended for this section**

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

This Question/Answer Booklet

Formula Sheet

***To be provided by the student***

Standard items: pens, pencils, pencil sharpener, eraser, correction fluid/tape, ruler,

highlighters

Special items: nil

**Important note to students**

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 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 | 6 | 6 | 50 | 50 |  |
| Section Two  Calculator-assumed | 13 | 13 | 100 | 100 |  |

|  |  |  |
| --- | --- | --- |
| Total | 150 | 100 |

**Instructions to students**

1 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. 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.

2 **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.

3 It is recommended that you **do not use pencil**, except in diagrams.

**Section One: Calculator-free (50 marks)**

This section has **six (6)** questions. Answer all questions. Write your answers in the spaces provided.

Working time: 50 minutes

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question 1 (10 marks)**

(a) Evaluate , giving your answer in scientific notation. (2)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ 0.5 X 106 (not in scientific notation)  ✓✓ 5 X 105 |

(b) How many significant figures are there in 10.082? (1)

|  |
| --- |
| **Solution** |
| 5 |
| **Specific behaviours** |
| ✓ or X |

(c) Factorise  (1)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ or X |

(d) If , determine the value of . (2)

|  |
| --- |
| **Solution** |
| 7 – ( -3)2 = 7 – 9 = -2 |
| **Specific behaviours** |
| ✓ 7 – 9  ✓ correct answer of negative 2 |

(e) Determine the coordinates of the -intercept for the function,

. (1)

|  |
| --- |
| **Solution** |
| (0,6) , do not accept just 6 only |
| **Specific behaviours** |
| ✓ or X |

**Question 1 (continued)**

(f) The following set of data is in order from smallest to largest.

5, 6, 11, 11,, 13, 18, 25

The range is six less than twice the value of . What is the median? (3)

|  |
| --- |
| **Solution** |
| 25 – 5 = 2x – 6  26 = 2x  x = 13  Median = |
| **Specific behaviours** |
| ✓ identify range as 20 and equates to 2x – 6  ✓ solves correctly for value of x  ✓ calculates median correctly |

**Question 2 (7 marks)**

A  200 m B 

230 m 200 m 180 m

C 350 m  D 260 m

200 m 220 m 430 m

470m E  350 m F 

200m 200 m

320 m 350 m

 H 420 m

G 300 m 150 m 100 m

I  J 

120 m

(a) Tommy, who owns a tourist resort at Hamlin Bay, wants to construct paths so that all of the cabins at his resort are connected.

1. Draw the minimum spanning tree of the network. (2)

|  |
| --- |
| **Solution** |
| C |
| **Specific behaviours** |
| ✓✓ |

**Question 2 (continued)**

1. Find the minimum spanning tree of the network? (2)

|  |
| --- |
| **Solution** |
| 200+260+180+200+220+200+100+150+200 = 1710 m |
| **Specific behaviours** |
| ✓ working or calculation  ✓ correct answer of 1710 m |

1. If the cost of constructing the paths is $50 per metre, what would be the minimum cost? (1)

|  |
| --- |
| **Solution** |
| 1710 X 50 = $ 85 500 |
| **Specific behaviours** |
| ✓ or X |

**Question 2 (continued)**

(b) The graph below gives the maximum and minimum temperatures () for a week in Bunbury.



X Maximum temperatures

O Minimum temperatures

1. Which set of data has a greater standard deviation? (1)

|  |
| --- |
| **Solution** |
| Minimum temperatures |
| **Specific behaviours** |
| ✓ or X |

1. Justify your answer to part (i) above. (1)

|  |
| --- |
| **Solution** |
| Wider spread of extreme scores |
| **Specific behaviours** |
| ✓ or X |

**Question 3 (8 marks)**

Solve each of the following equations.

(i)  (2)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ factorises correctly  ✓ correct values for “x” |

(ii)  (3)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ expand and rearrange correctly  ✓ factorises  ✓ solves for both values of x |

(iii)  (3)

|  |
| --- |
| **Solution** |
| OR |
| **Specific behaviours** |
| ✓ equates (x-5) to 7 and -7  ✓✓ solves correctly for both values of x |

**Question 4 (11 marks)**

(a) Joshua writes an Accounting examination and a Mathematics examination. He believes that he has a 0.4 chance of passing the Mathematics examination, a 0.6 chance of passing the Accounting examination and a 0.3 chance of passing both of them.



0.3

0.3

0.3

0.1

1. Complete the Venn diagram above, where M denotes Mathematics and A denotes Accounting. (2)

|  |
| --- |
| **Solution** |
| As shown above |
| **Specific behaviours** |
| ✓✓ correct entries |

1. Determine

 the probability that Joshua passes Mathematics or Accounting or both. (1)

|  |
| --- |
| **Solution** |
| 0.1 + 0.3 + 0.3 = 0.7 |
| **Specific behaviours** |
| ✓ or X |

  (1)

|  |
| --- |
| **Solution** |
| 0.3 |
| **Specific behaviours** |
| ✓ or X |

  (1)

|  |
| --- |
| **Solution** |
| 0.1 |
| **Specific behaviours** |
| ✓ or X |

  (1)

|  |
| --- |
| **Solution** |
| 0.6 |
| **Specific behaviours** |
| ✓ or X |

**Question 4 (continued)**

(b) Two families borrow different amounts of money from the bank on the same day. The

Wilson family has a flat rate loan while the Smith family has a reducible interest loan

and repays the loan earlier than the Wilson family. Which of the following graph best represents this situation? (1)

A B



C D



|  |
| --- |
| **Solution** |
| Graph C |
| **Specific behaviours** |
| ✓ or X |

(c) (i) Describe the shading in the Venn diagram below using set notation. (1)



|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ or X |

**Question 4 (continued)**

(ii) Shade the region in the Venn diagram below that is represented by  (1)



|  |
| --- |
| **Solution** |
| As shown above |
| **Specific behaviours** |
| ✓ or X |

(iii) Complete the statement and justify your answer. (2)

“The set of months in 2012 with exactly 28 days is …………………………………

|  |
| --- |
| **Solution** |
| The set of months in 2012 with exactly 28 months is the empty set or  or { }  2012 is a leap year so February has 29 days |
| **Specific behaviours** |
| ✓ identify it is the empty set  ✓ identify 2012 is a leap year |

**Question 5 (10 marks)**

(a) The average height, H, in cm, of a girl between the ages of 6 years and 11 years can be represented by a line with equation H = 6A + 84 where A is the age in years.

1. For this line, state the gradient and explain what does this indicate about the heights of girls aged 6 to 11 years? (2)

|  |
| --- |
| **Solution** |
| Gradient is 6  The average height of a girl increases by 6 cm per year for girls between 6 to 11 years. |
| **Specific behaviours** |
| ✓ correct gradient  ✓ increases by 6 cm |

1. Give one reason why this equation is not suitable for predicting heights of girls older than 12 years. (1)

|  |
| --- |
| **Solution** |
| The increase in height as girls get older will not be linear. In fact heights will increase slowly and then stop otherwise they will be giants. |
| **Specific behaviours** |
| ✓ suitable valid reason |

**Question 5 (continued)**

(b) A rectangular playing surface is to be constructed such that the length,  is 6 metres longer than the width, .

1. Write an equation for the area, A, of the playing surface in terms of its length, . (2)

|  |
| --- |
| **Solution** |
| Length = *l*  Width = ( *l* – 6 )  A = *l* ( *l* – 6 ) |
| **Specific behaviours** |
| ✓ correct expression for the width  ✓ correct expression for the area |

A graph comparing the area of the playing surface to its length is drawn below.



1. Why are lengths of 0 to 6 metre not possible? (1)

|  |
| --- |
| **Solution** |
| Width cannot be a negative value or zero, eg -6,-5,-4,-3,-2,-1,0 |
| **Specific behaviours** |
| ✓ |

1. What would the dimensions of the playing surface be if it had an area of ? (2)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ length value of 15  ✓ width value of 9 |

1. If the width is 10m, what is the area of the playing surface? (2)

|  |
| --- |
| **Solution** |
| Area = 160 m2 |
| **Specific behaviours** |
| ✓ correct length value of 16  ✓ correct area of 160 |

**Question 6 (4 marks)**

A new test has been developed to determine whether a person is a carrier of the Ross River virus. A group of 200 people was tested at random and the results are tabulated in the following incomplete table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Positive | Negative | Total |
| Carrier | 74 | 12 | **86** |
| Not a Carrier | **98** | 16 | **114** |
| Total | **172** | **28** | **200** |

(a) Complete the table (2)

|  |
| --- |
| **Solution** |
| As per table above |
| **Specific behaviours** |
| ✓✓ for correct entries |

(b) If a person is selected at random from the group of 200,

What is the probability that

1. He / she is not a carrier but tested positive to the virus? (1)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ or X |

1. It is given that the person is tested negative, he/she is a carrier. (1)

|  |
| --- |
| **Solution** |
|  |
| **Specific behaviours** |
| ✓ or X |