



## Western Australian Certificate of Education Examination, 2010

### Question/Answer Booklet

# MATHEMATICS 2A/2B

## Section One: Calculator-free

Please place your student identification label in this box

Student Number: In figures

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In words

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### 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	6	6	50	40	
Section Two: Calculator-assumed	13	13	100	80	
Total				120	100

## Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2010*. 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.
3. **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.
4. It is recommended that you **do not use pencil**, except in diagrams.

**Section One: Calculator-free****(40 Marks)**

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

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.

Working time: 50 minutes.

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**Question 1****(4 marks)**

(a) Evaluate  $4 - (7 - 11)^2 \div 2$ .

**(2 marks)**

(b) In a recent test, Ryan was asked to expand  $(2x + 3)(x - 9)$ . Ryan's response was  $2x^2 - 27$ . Determine whether Ryan was correct or not. Justify your answer. **(2 marks)**

**Question 2****(6 marks)**

The ratio of boys to girls in Jessie's Mathematics 2A/2B class is 2:3. Her class recently completed a test for which the maximum score was 50 marks. The parts of the question below relate to Jessie's class and the test they completed.

(a) If there were 12 girls in the class, how many boys were there? (1 mark)

(b) Jessie received 68% for her test. What score (out of 50) did Jessie obtain? (1 mark)

(c) Michael got 18 out of 50 for his test. Write his score as a decimal. (1 mark)

(d) Mikayla said that she got a test score greater than 75% but less than  $\frac{4}{5}$  of the maximum score. All of the girls' test scores, out of 50, are listed in order below.

19, 22, 30, 32, 34, 36, 37, 39, 40, 44, 45, 48

What score did Mikayla obtain? (2 marks)

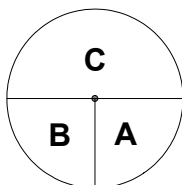
(e) Adrian was exaggerating to his friends. He said that he practised seventy-five million questions before the test. Write this number in scientific notation. (1 mark)

Question 3

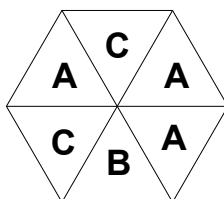
(7 marks)

Consider the spinners shown below.

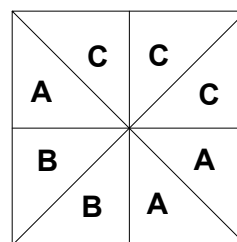
Spinner I



Spinner II



Spinner III



- (a) Order the spinners above from **most likely** to **least likely** to spin the letter C. (2 marks)

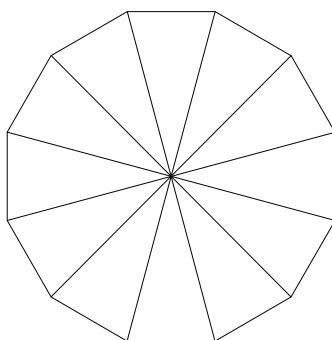
- (b) Spinner II is spun 30 times. How many 'B's would you expect? (1 mark)

- (c) Emily spins one of the spinners above 120 times. Her results are shown in the table on the right. Which is most likely the spinner that Emily used? Justify your choice.

Letter	Frequency
A	61
B	19
C	40

(2 marks)

- (d) Madeline uses a new spinner to run a simulation 60 times. The spinner has 12 equal sectors as shown and uses only the letters A, B and C. Madeline recorded her results as 10 'A's, 31 'B's and the rest 'C's. Complete the spinner below so that it is most likely the spinner that Madeline used. (2 marks)



Question 4

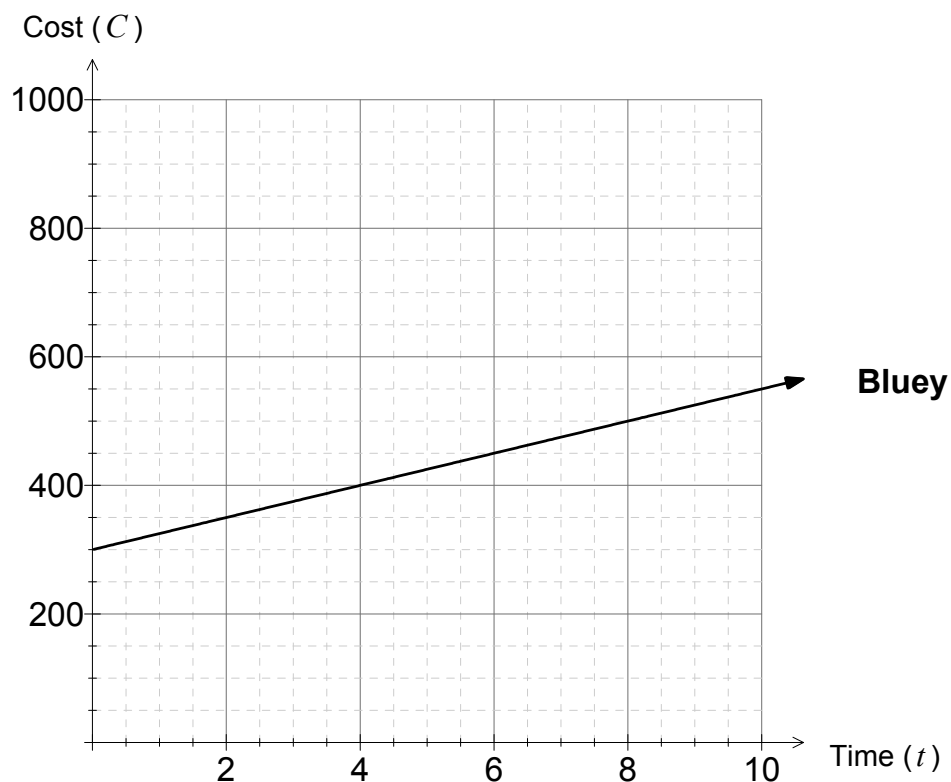
(9 marks)

Dougal is an electrician who likes to be considered 'good value for money' by his customers. Dougal charges an hourly rate of \$75 per hour but no callout fee.

- (a) Complete the table of values below to show the cost of having Dougal complete jobs of varying lengths. (2 marks)

Time ( $t$ hours)	0	2.5	4	10
Cost (\$ $C$ )	0		300	

- (b) On the axes below, plot the cost of Dougal completing a job of length  $t$  hours. The cost of Bluey, another electrician, has already been plotted. (1 mark)



- (c) Write a rule to calculate the cost of employing Dougal for any length of time ( $t$ ). (1 mark)

- (d) Write a rule to calculate the cost of employing Bluey for any length of time ( $t$ ). (2 marks)
- (e) Bullet works very quickly, but charges a callout fee of \$100. For 2 hours of work, Bullet charges a total of \$200. Graph the cost of employing Bullet on the same axes as Dougal and Bluey. (1 mark)
- (f) You are keen to pay as little money as possible. For what interval of time would you employ Bullet instead of Dougal or Bluey? (2 marks)

**Question 5****(8 marks)**

Solve algebraically for each unknown.

(a)  $2(p+1) - 3p = 3 - 2p$

(2 marks)

(b)  $3W^2 - 5 = 43$

(2 marks)

(c)  $2^x - 1 = 31$

(2 marks)

(d)  $28 - 3k \geq 13$

(2 marks)



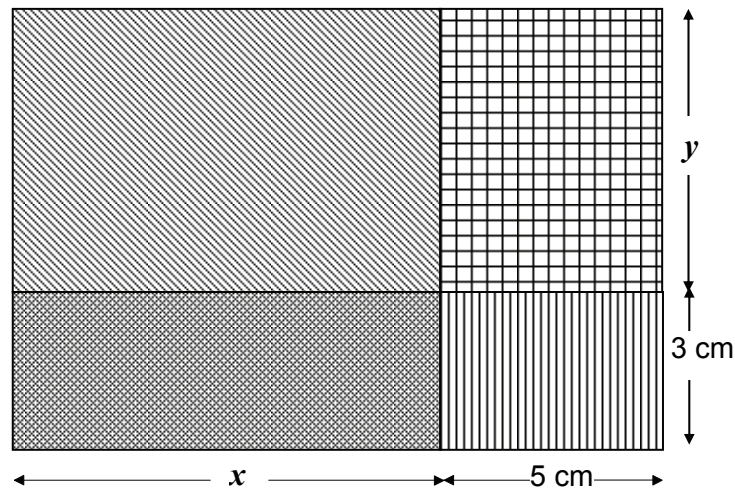
**Question 6**

**(6 marks)**

Sonya designs patchwork quilts, which are constructed from a number of rectangular patches joined together. Each patch is made up of four smaller rectangles, as shown in the diagram below.

Sonya already has some material which measures 5 cm by 3 cm, cut, and plans to use this in one corner of her rectangular patch. She is experimenting with the lengths  $x$  and  $y$  to complete her patch design.

**Rectangular patch:**



- (a) If  $x = 7$  and  $y = 4$ , calculate the area of the rectangular patch. (1 mark)
- (b) If  $y = 4$ , state the area of the rectangular patch in terms of  $x$  (in expanded form). (1 mark)
- (c) The area of the rectangular patch can be expressed as  $(x + 5)(y + 3)$ . Expand this expression. (2 marks)
- (d) Using the expanded expression from (c), show that the area when  $x = 7$  and  $y = 4$  is the same as the area in (a). (2 marks)

**End of questions**

**Additional working space**

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

**Additional working space**

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

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