

SCHOOL**Semester One Examination, 2013**
Question/Answer Booklet**MATHEMATICS 3C**
Section Two:
Calculator-assumedIf required by your examination administrator, please
place your student identification label in this box

Student Number: In figures

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In words _____

Your name _____

Time allowed for this section

Reading time before commencing work: ten minutes

Working time for this section: one hundred minutes

Materials required/recommended for this section*To be provided by the supervisor*

This Question/Answer Booklet

Formula Sheet (retained from Section One)

To be provided by the candidate

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

Special items: drawing instruments, templates, notes on two unfolded sheets of A4 paper,
and up to three calculators satisfying the conditions set by the Curriculum
Council for this examination.**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.

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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	49	33
Section Two: Calculator-assumed	13	13	100	100	67
Total				149	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.
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.

Additional working space

Question number: _____

Question 9
It is estimated that 6% of gift cards sold by a retail store are never redeemed.

- (a) One day, 23 gift cards were sold. Let X be the number of these gift cards that will not be redeemed.

(i) Define a suitable probability distribution to model X . (1 mark)

(ii) State the mean and standard deviation of this distribution. (2 marks)

(iii) Calculate $P(X = 4)$. (1 mark)

(iv) Calculate $P(X > 0)$. (1 mark)

- (b) What is the minimum number of gift cards that must be sold, so that the probability that at least one of them will not be redeemed exceeds 90%? Justify your answer. (2 marks)

See next page

Question number: _____

- (c) Can the above rate of change model be used to calculate how long it takes the temperature of the casting to fall below 40°C ? Explain your answer. (3 marks)

(d) Use calculus to determine the maximum area of the rectangle. (3 marks)

(e)

- (f) Determine the initial temperature of the casting, given that it had cooled to 787°C after one minute. (2 marks)

(g) Show that the area of rectangle ABC is given by $A = 15x - 2x^2 - x^3$, where x is the x -

(h)

- (i) Determine the initial temperature of the casting, did it take for the initial temperature of the casting to rise by 7°C to the nearest second, did it take for the initial temperature of the casting to rise by 14°C to the nearest second, did it take for the initial temperature of the casting to rise by 21°C to the nearest second? (3 marks)

(j) What is the most likely number of gift cards that will never be redeemed? (1 mark)

- (k) Find the area of the rectangle when $x = 7$. (1 mark)

(l)

- (m) How long, to the nearest second, did it take for the initial temperature of the casting to rise by 7°C to the nearest second, did it take for the initial temperature of the casting to rise by 14°C to the nearest second, did it take for the initial temperature of the casting to rise by 21°C to the nearest second? (3 marks)

(n) Show that the area of rectangle ABC is given by $A = 15x - (x + 1)^2$. (1 mark)

(o)

- (p) The temperature of a bronze casting after removal from an oven was observed to change according to the rule $\frac{dt}{dt} = 0.0034t$ for $0 \leq t \leq 800$. (6 marks)

(q) The temperature of the casting, in degrees Celsius, t , seconds after being removed from the oven, is given by the equation $T = 15 + 0.0034t$. (6 marks)

(r)

- (s) The temperature of a bronze casting after removal from an oven was observed to change according to the rule $\frac{dt}{dt} = 0.0034t$ for $0 \leq t \leq 800$. (6 marks)

(t) The temperature of the casting, in degrees Celsius, t , seconds after being removed from the oven, is given by the equation $T = 15 + 0.0034t$. (6 marks)

(u)

- (v) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(w) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(x)

- (y) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

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(aa)

- (bb) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(cc) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

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- (ee) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

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(gg)

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(jj)

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(mm)

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(pp)

- (qq) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(rr) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(ss)

- (tt) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(uu) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

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(xx) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(yy)

- (zz) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(aa) A rectangular ABCD is such that O is a corner of the rectangle. The vertices A , B and C lies on the x -axis and D lies on the y -axis. The area of the rectangle is 15 square units. (10 marks)

(bb)

