Papers written by Australian Maths Software

SEMESTER TWO

YEAR 11

MATHEMATICS METHODS
Units 1 & 2
REVISION 3
2016

Section One
(Calculator–free)

Name: _____

Teacher: _____

TIME ALLOWED FOR THIS SECTION

Reading time before commencing work: 5 minutes
Working time for section: 50 minutes

MATERIAL REQUIRED / RECOMMENDED FOR THIS SECTION

To be provided by the candidate
Standard items*:* pens, pencils, pencil sharpener, highlighter, eraser, ruler.

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. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

To be provided by the supervisor
Question/answer booklet for Section One.
A formula sheet which may also be used for Section Two.

Structure of this examination

	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**	**52**	**35**
Section Two Calculator—assumed	9	9	100	98	65
Total marks				150	

Instructions to candidates

1. The rules for the conduct of this examination are detailed in the Information Handbook. Sitting this examination implies that you agree to abide by these rules.

2. Write your answer in the Question/Answer booklet.

3. 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.

4. Spare pages are provided at the end of this booklet. If you need to use them, indicate in the original answer space where the answer is continued i.e. give the page number.

5. 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.

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

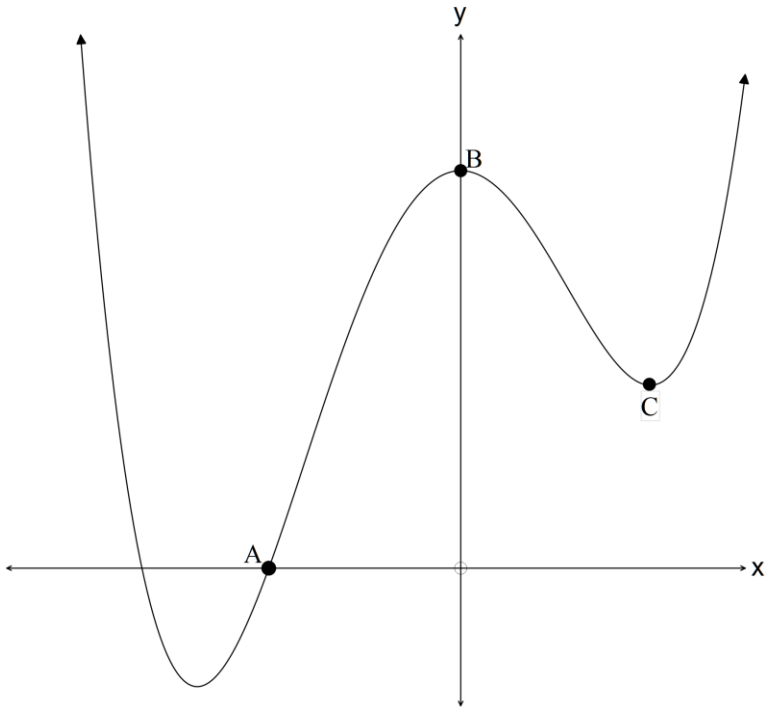
7. The Formula Sheet is **not** to be handed in with your Question/Answer booklet.

Section One: Calculator–free 52 marks

This section has **six (6)** questions. Attempt **all** questions.
Working time: 50 minutes

Question 1 **(3 marks)**

Given the function graphed below, describe precisely the features of each of the labelled points.



A _____ (1)

B _____ (1)

C _____ (1)

Question 2 **(16 marks)**

(a) Simplify $81^{\frac{3}{4}} + 10\left(0.001^{\frac{1}{3}}\right) - \sqrt{\frac{1}{16^{-1}} + \frac{1}{9^{-1}}}$ (4)

(b) Solve

(i) $\left(\frac{1}{3}\right)^{2x+1} = 9^3$ (3)

(ii) $25^x + 5^3 = 6 \times 5^{x+1}$ (3)

(iii) $x^3 + 1 = x^2 + x$ (3)

(b) If a person in pain is injected with 100 mg of a drug then the concentration (C) left in the bloodstream after t hours is given by $C = 100(0.7)^t$.

The drug is only safe to inject every 5 hours and 100 mg is the maximum recommended dose.

If the person has pain relief if the concentration in the bloodstream is at least 35 mg how many hours does of pain relief does the person get? (3)

Question 3 **(6 marks)**

(a) Given the rule $A_n = \frac{1+n}{2}$, rewrite the rule recursively. (3)

(b) Given A sequence is defined as $T_{n+1} = 2T_n$ with $T_1 = 6$,

(i) determine the first four terms. (1)

(ii) the expression in terms of n. (2)

Question 4 **(4 marks)**

Complete the following

$f(x) = 1 - 4x$

$f(x+h) =$ _____

By definition

$$f'(x) = \lim_{h \to 0} \left(\frac{f(x+h) - f(x)}{(x+h) - x} \right)$$

and

$f(x+h) - f(x) =$ _____

$\dfrac{f(x+h) - f(x)}{h} =$ _____

$=$ _____

Therefore

$$f'(x) = \lim_{h \to 0} \left(\qquad \right)$$

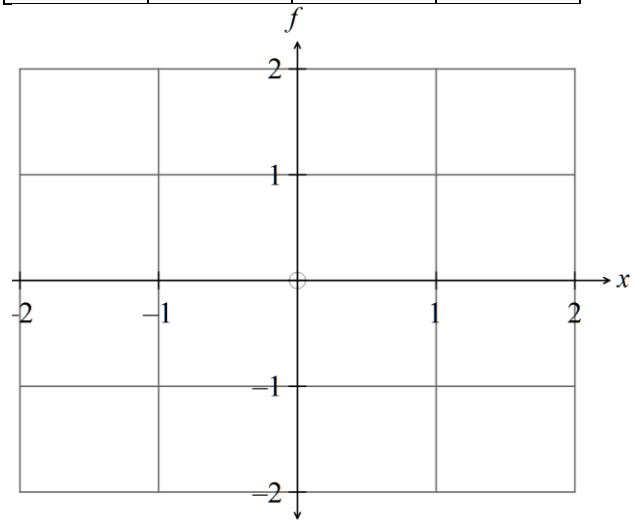
$\therefore \quad f'(x) =$ _____

(4)

Question 5 **(10 marks)**

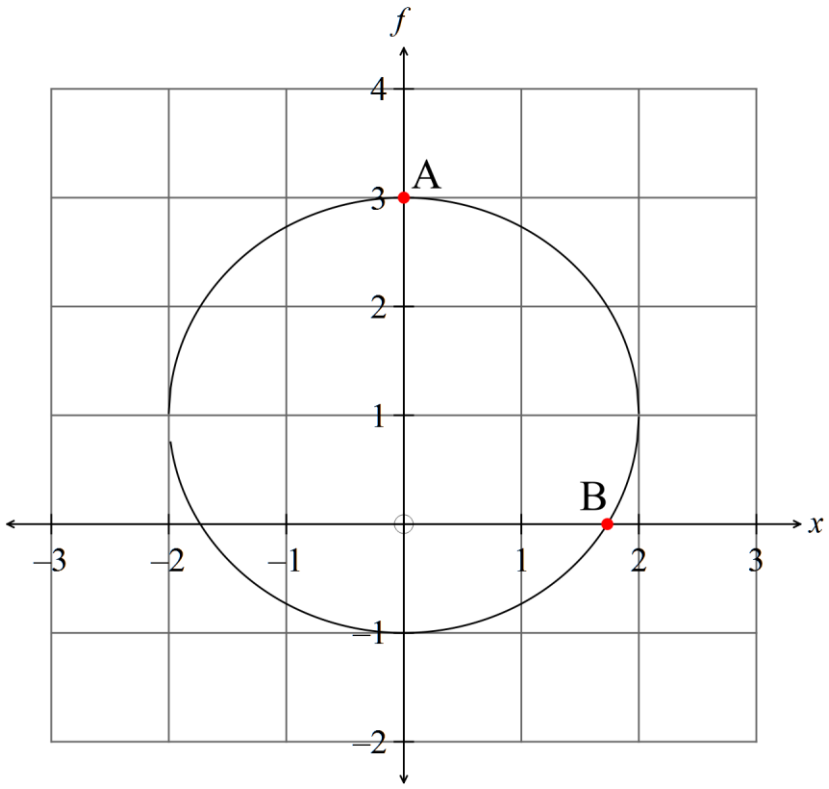
(a) (i) Graph a function that has the following properties on the set of axes below. (4)

x	-1	0	1
f	-1	0	1
f '	+	0	+



(ii) Write down the equation of the function. (2)

(b) The diagram below shows the relation $x^2 + (y-2)^2 = 4$



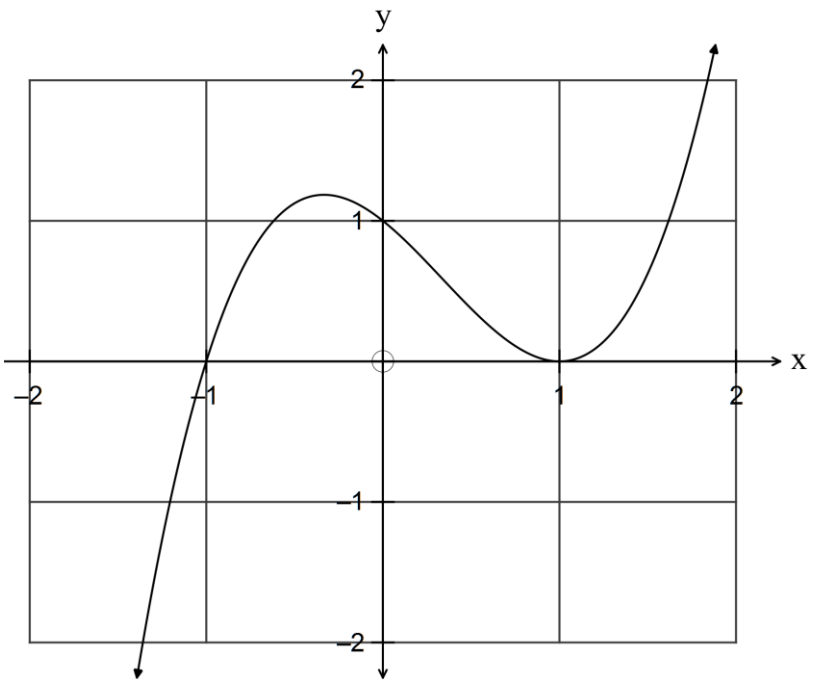
(i) Find the slope of point A and state another point with the same slope. (2)

(ii) Write down the coordinates of a point where the slope is not defined. (1)

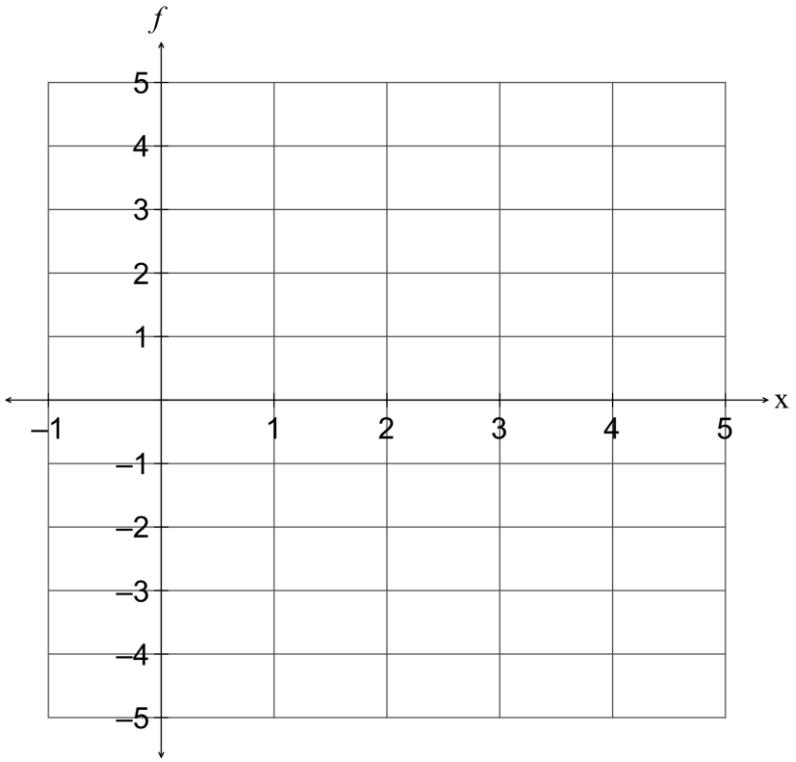
(iii) Describe point B. (1)

Question 6 **(13 marks)**

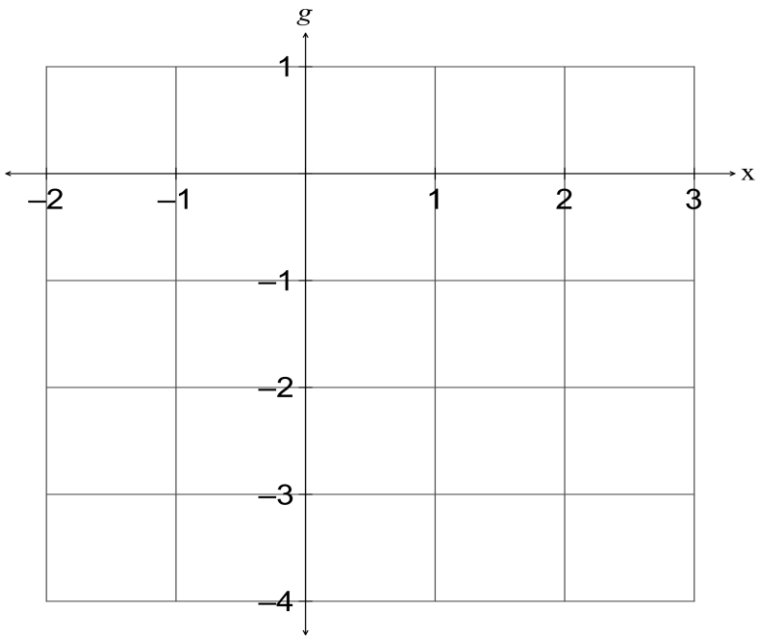
(a) Determine the equation of the function graphed on the set of axes below. (3)



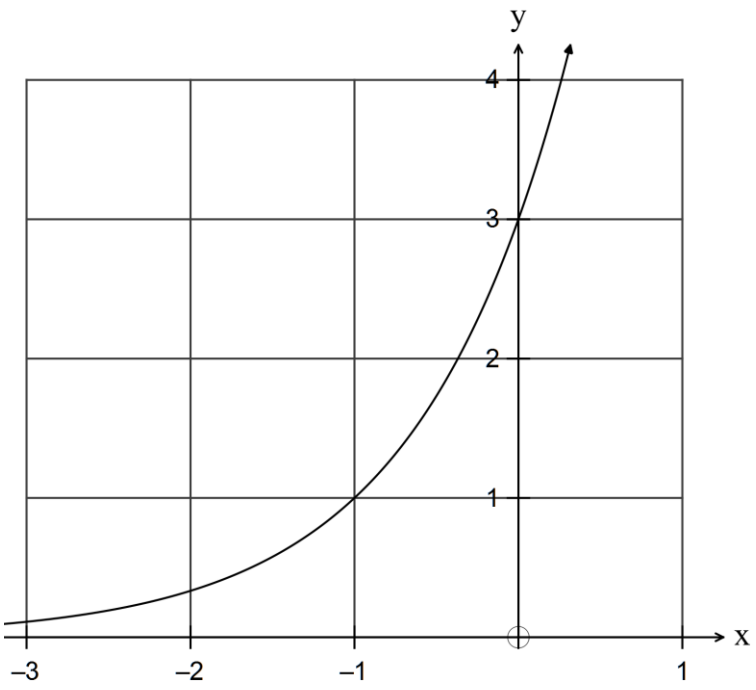
(b) On the set of axes below sketch the function $f(x) = -2(x-2)^2 + 5$ showing all intercepts. (4)



(c) On the set of axes below sketch the function $g(x) = 1 - 2^x$ showing any intercepts. (3)



(d) Determine the equation of the function graphed on the set of axes below. (3)



END OF SECTION ONE