

Trial Examination 2012

VCE Mathematical Methods (CAS) Units 3 & 4

Written Examination 1

Question and Answer Booklet

Reading time: 15 minutes Writing time: 1 hour

Student's Name:	
Teacher's Name:	

Structure of Booklet

Number of questions	Number of questions to be answered	Number of marks
10	10	40

Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers.

Students are NOT permitted to bring into the examination room: notes of any kind, blank sheets of paper, white out liquid/tape or a calculator of any type.

Materials supplied

Question and answer booklet of 10 pages, with detachable sheet of miscellaneous formulas in the centerfold.

Working space is provided throughout the booklet.

Instructions

Detach the formula sheet from the centre of this book during reading time.

Write your **name** and **teacher's name** in the space provided above on this page.

All written responses must be in English.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

Students are advised that this is a trial examination only and cannot in any way guarantee the content or the format of the 2012 VCE Mathematical Methods (CAS) Units 3 & 4 Written Examination 1.

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In	str	uct	ions	١

Answer **all** questions in the spaces provided.

In all questions where a numerical answer is required an exact value must be given unless otherwise specified.

In questions where more than one mark is available, appropriate working **must** be shown.

Unless otherwise indicated, the diagrams in this booklet are **not** drawn to scale.

Question	1
Z	_

3 marks

Δ.,	estion	2
Ou	estion	.)

Functions f and g are given by

$$f: R \to R$$
 where $f(x) = x^2$
and $g: R \setminus \{-2\} \to R$ where $g(x) = \frac{1}{x+2}$

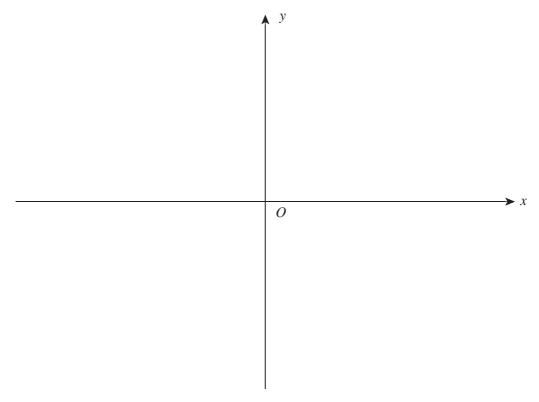
Solve the equation $f(g)$	(x))=4.	
		2
The inverse of g is g^{-1} .		
The inverse of g is g^{-1} .	dai	
The inverse of g is g^{-1} . Find $g^{-1}(x)$, stating its	domain and range.	
	domain and range.	

3 marks Total 5 marks

ind the smallest positive value of x that satisfies the equation $\cos\left(\frac{x}{2} + \frac{\pi}{3}\right) = \frac{1}{\sqrt{2}}$.						

a. Sketch the curve with equation $y = \frac{2x-1}{x+1}$.

State the coordinates of the points where the curve intersects the coordinate axes, and the equations of any asymptotes.



4 marks

b. Hence, or otherwise, solve the inequality $0 < \frac{2x-1}{x+1} < 2$.

1 mark Total 5 marks

Question	6
Vaccion	v

A continuous random variable X has probability density function

$$f(x) = \begin{cases} ax + b & \text{if } 0 \le x \le 1\\ 0 & \text{elsewhere} \end{cases}$$

The mean of X is $\frac{7}{12}$.	
Find the values of a and b .	
	4 mark
Question 7	
If two events, A and B, are such that $Pr(A) = \frac{2}{5}$, $Pr(B) = \frac{1}{5}$ and $Pr(A B) = \frac{3}{5}$, find $Pr(B A)$.	
5, 11(2) 5, 11(2) 5, 11(2) 5, 11(2) 1.	
	3 mark

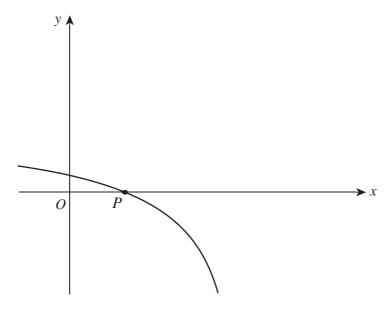
The discrete random variable X has the probability distribution

х	0	1	2	3
Pr(X = x)	2 <i>p</i>	$2p^2$	$p^2 + p$	$2p^2 + p$

Find the value of p .			

Part of the graph of $y = 4 - e^{2x}$ is shown below.

The curve crosses the x-axis at P. The coordinates of P are $(\log_e(2), 0)$.



a. Show that the equation of the normal to the curve $y = 4 - e^{2x}$ at the point P is given

	1	1
by	$y = \frac{1}{8}x$	$-\frac{1}{8}\log_e(2)$

,

	y-axis.
	3 mar Total 5 mar
	2344
Que	tion 10
	tion 10
Con	tion 10 ider the function $f: R \to R, f(x) = x + \sqrt{x^2 + 1}$.
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Con	tion 10 ider the function $f: R \to R, f(x) = x + \sqrt{x^2 + 1}$.

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			3
Hence, evalu	$\int_0^1 \frac{1}{\sqrt{x^2 + 1}} dx.$		

END OF QUESTION AND ANSWER BOOKLET