

Trial Examination 2022

VCE Mathematical Methods Units 1&2

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 and rulers.

Students are NOT permitted to bring into the examination room: any technology (calculators or software), notes of any kind, blank sheets of paper and/or correction fluid/tape.

Materials supplied

Question and answer booklet of 11 pages

Formula sheet

Working space is provided throughout the booklet.

Instructions

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

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

All written responses must be in English.

At the end of the examination

You may keep the formula sheet.

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

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Instructions

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 (3 marks)		
Solve $\log_{14}(x-2) + \log_{14}(x+3) = 1$ for x .		

Question 2 (3 marks)
Let $P(x) = 2x^3 - 5x^2 + 3x - 4$.
Express $P(x)$ in the form $P(x) = D(x)Q(x) + R(x)$ when divided by $x - 2$.

Question 3 (5 marks)

Consider the data shown in the table below.

x	1	2	3	4	5	6
Pr(X = x)	2 <i>a</i>	3 <i>a</i>	a	a	3 <i>a</i>	2 <i>a</i>

a. If the table shows a probability distribution, what is the value of *a*?

1 mark

b. Find Pr(X < 3).

1 mark

c. Find $Pr(1 < X \le 4)$.

1 mark

d. Find $Pr(X < 3 | X \le 5)$.

2 marks

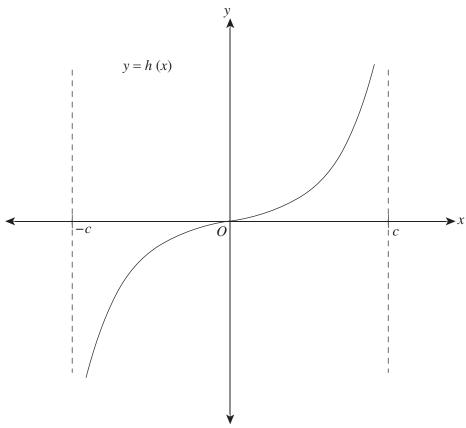
Question	4	(7	marks)	
Question	•	(/	marks)	

Question 4 (7 marks)
Let $f : \mathbb{R} \to \mathbb{R}$, $f(x) = 2x(x^3 - 2x^2 + 2x) - 3$.

Find	f(1).	1 marl
i.	Find $f'(x)$.	1 marl
ii.	Find <i>f</i> ′(–1).	1 mark
Dete	rmine the coordinates and nature of any stationary points.	4 mark

Question 5 (4 marks)

The graph of the function $h:(-c, c) \to \mathbb{R}$, $h(x) = 2\tan\left(\frac{x}{4}\right)$ is shown below.



b. Find the average rate of change of h between x = 0 and $x = \pi$.

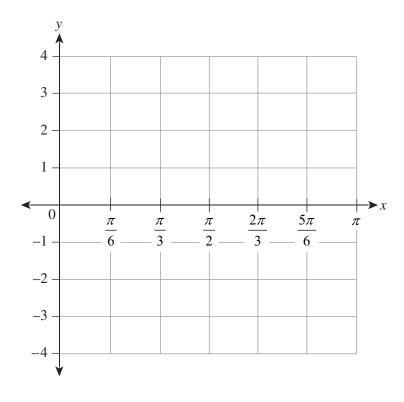
Question 6 (5 marks)

a. Solve $2\cos(2x) + 1 = 0$ for $x \in [0, \pi]$.

2 marks

b. Sketch the graph of $y = 2\cos(2x) + 1$ for $x \in [0, \pi]$ on the axes provided. Indicate the coordinates of the endpoints, turning points and any intercepts.

3 marks



Question 7 (3 marks) A quadratic equation has a wintercent at (0 - 7) and two points at (-2 - 70) and (2 - 2)
A quadratic equation has a <i>y</i> -intercept at $(0, -7)$ and two points at $(-3, -70)$ and $(3, 2)$. Find the equation of the quadratic function in turning point form.
That the equation of the quadratic function in turning point form.

sit together, how many possible seating arrangements exist? s sit together, how many possible seating arrangements exist? y four seats remain for the movie session that the students wish to attend. see girls and one boy attend the cinema, how many possible combinations atts exist?	
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	1 mark
t two girls attend the cinema, how many possible combinations of exist?	1 mark

Question 9 (2 marks)				
For $f(x) = \frac{6x^2 + 7x - 3}{3x - 1}$, where $x = \frac{1}{3}$, find $\lim_{x \to \frac{1}{3}} f(x)$.				

Question	10	(4	marks)

Show that $f(x) = -2x^3 + 2x^2$	-4x - 24, given that $f'(x) = -2x(3x - 2) - 4$ and $f(-2) = 8$.	2 mar
Find $\int_0^2 (3x^2 - 4x + 6) \cdot dx$.		2 ma
-		
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END OF QUESTION AND ANSWER BOOKLET



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VCE Mathematical Methods Units 1&2

Written Examinations 1 and 2

Formula Sheet

Instructions

This formula sheet is provided for your reference.

A question and answer booklet is provided with this formula sheet.

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MATHEMATICAL METHODS FORMULAS

Mensuration

area of a trapezium	$\frac{1}{2}(a+b)h$	volume of a pyramid	$\frac{1}{3}Ah$
curved surface area of a cylinder	$2\pi rh$	volume of a sphere	$\frac{4}{3}\pi r^3$
volume of a cylinder	$\pi r^2 h$	area of a triangle	$\frac{1}{2}bc\sin(A)$
volume of a cone	$\frac{1}{3}\pi r^2 h$		

Calculus

Probability

Pr(A) = 1 - Pr(A')	$Pr(A \cup B) = Pr(A) + Pr(B) - Pr(A \cap B)$
$\Pr(A \mid B) = \frac{\Pr(A \cap B)}{\Pr(B)}$	

END OF FORMULA SHEET