

Year 2002

VCE

Mathematical Methods

Trial Examination 1



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**VICTORIAN CERTIFICATE OF EDUCATION
2002**

MATHEMATICAL METHODS

Trial Written Examination 1 (Facts, skills and applications)

Reading time: 15 minutes
Total writing time: 1 hour 30 minutes

PART I

MULTIPLE-CHOICE QUESTION BOOK

Directions to students

This examination has two parts: Part I (multiple-choice questions) and Part II (short answer questions)

Part I consists of this question book and must be answered on the answer sheet provided for multiple-choice questions.

Part II consists of a separate question and answer book.

You must complete **both** parts in the time allotted. When you have completed one part continue immediately to the other part. A detachable formula sheet for use in both parts is included.

At the end of the task

Place the answer sheet for multiple-choice questions (Part I) inside the front cover of the question and answer book (Part II). You may retain this question book.

Structure of book

<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
27	27	27

Directions to students

Materials

Question book of 13 pages.

Answer sheet for multiple-choice questions.

Working space is provided throughout the book.

You may bring to the examination up to four pages (two A4 sheets) of pre-written notes.

You may use an approved scientific and/or graphics calculator, ruler, protractor, set-square and aids for curve sketching

You should have at least one pencil and an eraser.

Instructions

Detach the formula sheet from the book during reading time.

Please ensure that your **name and student number** as printed on your answer sheet for multiple-choice questions are correct, **and** sign your name in the space provided to verify this.

Answer **all** questions.

There is a total of 27 marks available for Part I.

All questions should be answered on the answer sheet provided for multiple-choice questions.

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

At the end of the task

Place the answer sheet for multiple-choice questions (Part I) inside the front cover of the question and answer book (Part II). You may retain this question book.

VCE MATHEMATICAL METHODS 2002

Trial Written Examination 1

ANSWER SHEET

NAME: _____

STUDENT
NUMBER _____

SIGNATURE _____

Instructions

- Write your name in the space provided above.
- Write your student number in the space provided above. Sign your name.
- Use a **PENCIL** for **ALL** entries.
If you make a mistake, **ERASE** it - **DO NOT** cross it out.
- Marks will **NOT** be deducted for incorrect answers.
- **NO MARK** will be given if more than **ONE** answer is completed for any question.
- All answers must be completed like **THIS** example.

A	B	C	D	E
---	----------	---	---	---

1	A	B	C	D	E	15	A	B	C	D	E
2	A	B	C	D	E	16	A	B	C	D	E
3	A	B	C	D	E	17	A	B	C	D	E
4	A	B	C	D	E	18	A	B	C	D	E
5	A	B	C	D	E	19	A	B	C	D	E
6	A	B	C	D	E	20	A	B	C	D	E
7	A	B	C	D	E	21	A	B	C	D	E
8	A	B	C	D	E	22	A	B	C	D	E
9	A	B	C	D	E	23	A	B	C	D	E
10	A	B	C	D	E	24	A	B	C	D	E
11	A	B	C	D	E	25	A	B	C	D	E
12	A	B	C	D	E	26	A	B	C	D	E
13	A	B	C	D	E	27	A	B	C	D	E
14	A	B	C	D	E						

Please DO NOT fold, bend or staple this form

MATHEMATICAL METHODS

Written examinations 1 and 2

FORMULA SHEET

Directions to students

Detach this formula sheet during reading time.

This formula sheet is provided for your reference.

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

$\frac{d}{dx}(x^n) = nx^{n-1}$	$\int x^n dx = \frac{1}{n+1} x^{n+1} + c, n \neq -1$
$\frac{d}{dx}(e^{ax}) = ae^{ax}$	$\int e^{ax} dx = \frac{1}{a} e^{ax} + c$
$\frac{d}{dx}(\log_e x) = \frac{1}{x}$	$\int \frac{1}{x} dx = \log_e x + c, \text{ for } x > 0$
$\frac{d}{dx}(\sin ax) = a \cos ax$	$\int \sin ax dx = -\frac{1}{a} \cos ax + c$
$\frac{d}{dx}(\cos ax) = -a \sin ax$	$\int \cos ax dx = \frac{1}{a} \sin ax + c$
$\frac{d}{dx}(\tan ax) = \frac{a}{\cos^2 ax} = a \sec^2 ax$	

product rule: $\frac{d}{dx}(uv) = u \frac{dv}{dx} + v \frac{du}{dx}$

chain rule: $\frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx}$

quotient rule: $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$

approximation: $f(x + h) \approx f(x) + hf'(x)$

Statistics and Probability

$\Pr(A) = 1 - \Pr(A')$

$\Pr(A \cup B) = \Pr(A) + \Pr(B) - \Pr(A \cap B)$

$\Pr(A|B) = \frac{\Pr(A \cap B)}{\Pr(B)}$

mean: $\mu = E(X)$

variance: $\text{var}(X) = \sigma^2 = E((X - \mu)^2) = E(X^2) - \mu^2$

Discrete distributions			
	Pr(X = x)	mean	variance
general	$p(x)$	$\mu = \sum x p(x)$	$\sigma^2 = \sum (x - \mu)^2 p(x)$ $= \sum x^2 p(x) - \mu^2$
binomial	${}^n C_x p^x (1 - p)^{n-x}$	np	$np(1 - p)$
hypergeometric	$\frac{{}^D C_x {}^{N-D} C_{n-x}}{{}^N C_n}$	$n \frac{D}{N}$	$n \frac{D}{N} \left(1 - \frac{D}{N}\right) \frac{N - n}{N - 1}$
Continuous distributions			
normal	If X is distributed $N(\mu, \sigma^2)$ and $Z = \frac{X - \mu}{\sigma}$, then Z is distributed $N(0, 1)$.		

Table I Normal distribution – cdf

x	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359	4	8	12	16	20	24	28	32	36
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753	4	8	12	16	20	24	28	32	35
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141	4	8	12	15	19	23	27	31	35
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517	4	8	11	15	19	23	26	30	34
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879	4	7	11	14	18	22	25	29	32
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224	3	7	10	14	17	21	24	27	31
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549	3	6	10	13	16	19	23	26	29
0.7	.7580	.7611	.7642	.7673	.7703	.7734	.7764	.7793	.7823	.7852	3	6	9	12	15	18	21	24	27
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133	3	6	8	11	14	17	19	22	25
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389	3	5	8	10	13	15	18	20	23
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621	2	5	7	9	12	14	16	18	21
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830	2	4	6	8	10	12	14	16	19
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015	2	4	6	7	9	11	13	15	16
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177	2	3	5	6	8	10	11	13	14
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319	1	3	4	6	7	8	10	11	13
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441	1	2	4	5	6	7	8	10	11
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545	1	2	3	4	5	6	7	8	9
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633	1	2	3	3	4	5	6	7	8
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706	1	1	2	3	4	4	5	6	6
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767	1	1	2	2	3	4	4	5	5
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817	0	1	1	2	2	3	3	4	4
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857	0	1	1	2	2	2	3	3	4
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890	0	1	1	1	2	2	2	3	3
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916	0	1	1	1	1	2	2	2	2
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936	0	0	1	1	1	1	1	2	2
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952	0	0	0	1	1	1	1	1	1
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964	0	0	0	0	1	1	1	1	1
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974	0	0	0	0	0	1	1	1	1
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981	0	0	0	0	0	0	0	1	1
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986	0	0	0	0	0	0	0	0	0
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990	0	0	0	0	0	0	0	0	0
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993	0	0	0	0	0	0	0	0	0
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995	0	0	0	0	0	0	0	0	0
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997	0	0	0	0	0	0	0	0	0
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998	0	0	0	0	0	0	0	0	0
3.5	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	0	0	0	0	0	0	0	0	0
3.6	.9998	.9998	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	0	0	0	0	0	0	0	0	0
3.7	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	0	0	0	0	0	0	0	0	0
3.8	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	.9999	0	0	0	0	0	0	0	0	0
3.9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0	0	0	0	0	0	0	0	0

END OF FORMULA SHEET

Specific Instructions to students

This part consists of 27 questions.

Answer **all** questions in this part on the answer sheet provided for multiple-choice questions.

A correct answer scores 1, an incorrect answer scores 0. No mark will be given for a question if two or more letters are shaded for that question. Marks will not be deducted for incorrect answers. You should attempt every question.

Question 1

The graph of $f(x) = \frac{x-1}{x-2}$ has

- A. a vertical asymptote with equation $x = -2$ and a y intercept at $y = \frac{1}{2}$
- B. a horizontal asymptote with equation $y = -1$ and an x intercept at $x = \frac{1}{2}$
- C. a vertical asymptote with equation $x = 2$ and a horizontal asymptote with equation $y = -1$
- D. a vertical asymptote with equation $x = 2$ and a horizontal asymptote with equation $y = 1$
- E. a vertical asymptote with equation $x = 1$ and a horizontal asymptote with equation $y = 2$

Question 2

Given $f(x) = \frac{1}{2}e^{x+1}$ then $f^{-1}(x)$ equals

- A. $2e^{-x-1}$
- B. $\frac{e^{-x-1}}{2}$
- C. $\frac{2}{e^{1-x}}$
- D. $\log_e(2x) - 1$
- E. $2\log_e(x) - 1$

Question 3

The largest possible domain for which $f(x) = \sqrt{4 - x^2}$ is a one – one increasing function is:

- A. $[-2,0]$
- B. $[0,2]$
- C. $[-2,2]$
- D. R
- E. R^+

Question 4

A maximum value of $y = 10 - 2 \cos \frac{\pi(t-1)}{4}$ where $t \in R$ occurs when t equals

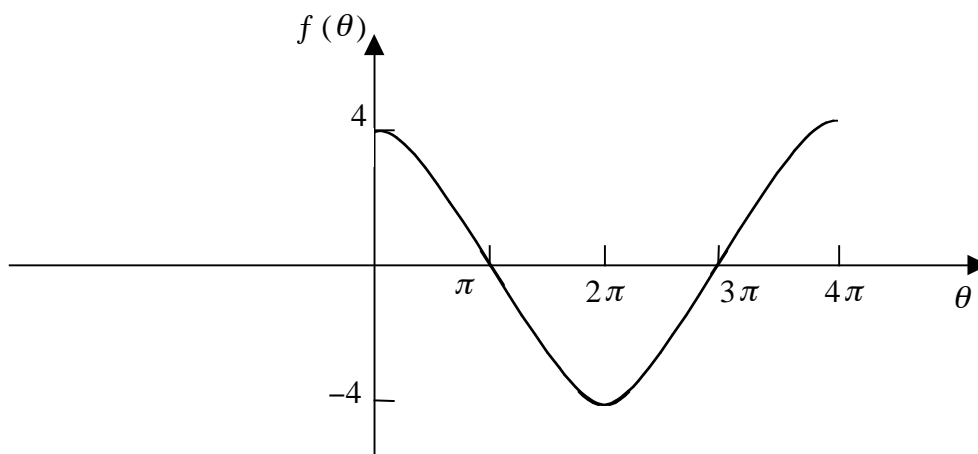
- A. 1
- B. 5
- C. 8
- D. 9
- E. 12

Question 5

If $\sin 2\theta + \cos 2\theta = 0$ and $0 \leq \theta \leq 2\pi$, then the difference between the largest and smallest solutions for θ is:

- A. $\frac{\pi}{2}$
- B. $\frac{3\pi}{4}$
- C. π
- D. $\frac{3\pi}{2}$
- E. $\frac{7\pi}{4}$

Question 6



The diagram above shows one cycle of a circular function. A possible equation for the function of this graph is:

- A. $2 \cos (2\theta) + 2$
- B. $2 \sin \left(\theta - \frac{\pi}{2}\right) + 2$
- C. $2 \sin 2\left(\theta - \frac{\pi}{2}\right) - 2$
- D. $2 \sin \frac{1}{2} \left(\theta - \frac{\pi}{2}\right) + 2$
- E. $4 \cos \left(\frac{\theta}{2}\right)$

Question 7

If $\log_a b = 1.6$ and $\log_a c = 2.2$ then $\log_a \left(\frac{b}{c}\right)^2$ is closest to:

- A. -1.2
- B. 0.36
- C. 0.53
- D. 1.2
- E. 1.89

Question 8

If $f(x) = x^3 + ax^2 + bx - 24$ and $(x - 2)$ and $(x + 3)$ are factors of $f(x)$, then:

- A. $a = -4, b = 1$
- B. $a = 4, b = -1$
- C. $a = 4, b = 1$
- D. $a = 5, b = 2$
- E. $a = 5, b = -2$

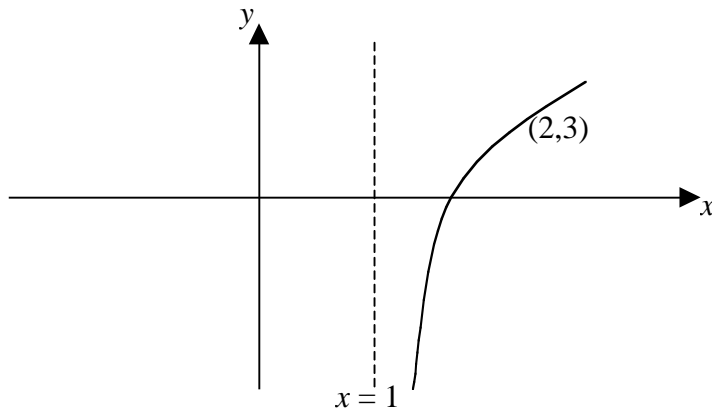
Question 9

If $y = 2a^{3x} + b$ then x equals:

- A. $\frac{1}{3} \log_a \left(\frac{y-b}{2}\right)$
- B. $\frac{1}{6} \log_a (y-b)$
- C. $\frac{1}{6} \log_a \left(\frac{y}{b}\right)$
- D. $\frac{1}{3} \log_a \left(\frac{2y}{b}\right)$
- E. $\frac{1}{3} \log_{2a} (y-b)$

Question 10

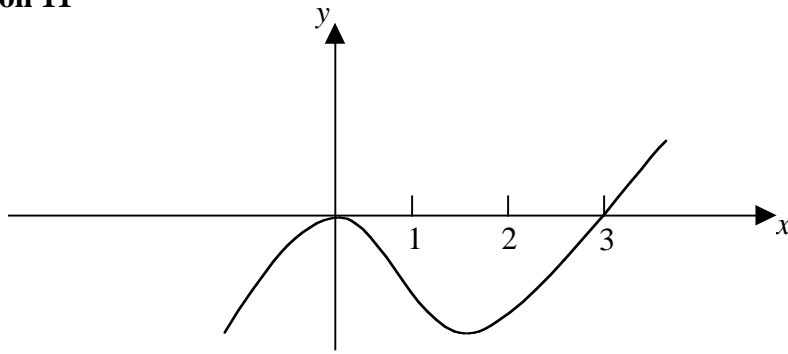
The graph of the function with equation, $y = \log_e(x + A) + B$ is shown below



The values of A and B are

- A. $A = 1, B = 3$
- B. $A = 2, B = 3$
- C. $A = -1, B = 3$
- D. $A = -1, B = 2$
- E. $A = 3, B = 2$

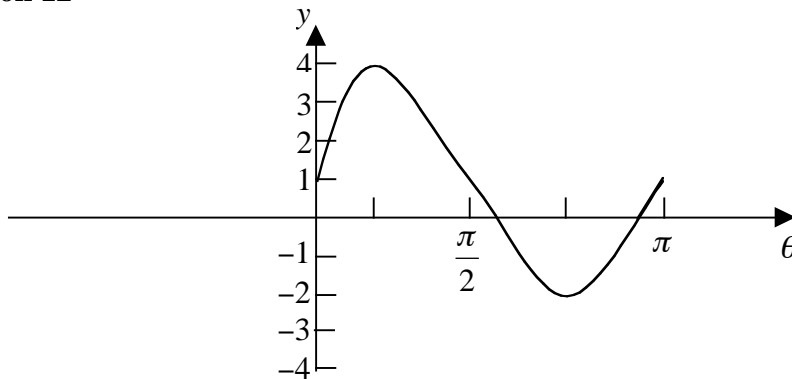
Question 11



The graph shown above could be a function whose equation is:

- A. $y = 3x^2 - x^3$
- B. $y = x^3 - 3x^2$
- C. $y = x^3 + 3x^2$
- D. $y = -(x^3 + 3x^2)$
- E. $y = 3x^2(x - 1)$

Question 12

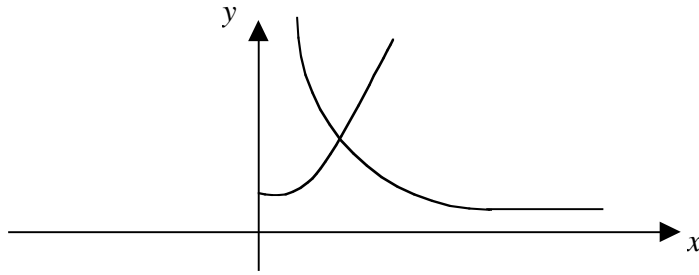


Which one of the following equations best describes the graph shown above?

- A. $3 \sin 2\theta + 1$
- B. $4 \sin \theta - 2$
- C. $3 \sin 2(\theta + \frac{\pi}{4}) + 1$
- D. $3 \cos 2(\theta - \frac{\pi}{4}) + 1$
- E. $3 \sin 2(\theta + \frac{\pi}{4}) - 1$

Question 13

The graphs of the functions $y = x^2 + 1$ and $y = \frac{1}{x}$ for $x > 0$ are shown below



The x coordinate of the point of intersection of these two graphs is closest to:

- A. 0.681
- B. 0.682
- C. 0.683
- D. 1.465
- E. 1.466

Question 14

The derivative of $\sin \log_e(x)$ with respect to x is:

- A. $\frac{\cos x}{x} + \cos x \log_e x$
- B. $\frac{\sin x}{x} + \cos x \log_e x$
- C. $\frac{1}{x} + \cos x$
- D. $\cos \log_e x$
- E. $\frac{\cos \log_e x}{x}$

Question 15

If $f(x) = x^2 \cos 2x$, then $f'(x)$ equals

- A. $2x[\cos 2x - x \sin 2x]$
- B. $2x[x \sin 2x - \cos 2x]$
- C. $-2x[x \sin 2x + \cos 2x]$
- D. $2x[x \sin 2x + \cos 2x]$
- E. $x[2\cos 2x + x \sin 2x]$

Question 16

The function $f(x) = \frac{e^x}{5 + e^x}$ has

- A. a local maximum at $x = 0$
- B. a local minimum at $x = 0$
- C. a local maximum and a local minimum
- D. a stationary point of inflexion
- E. no stationary points

Question 17

$\int_0^{\frac{\pi}{2}} \frac{\cos x}{\sin x + 1} dx$ is closest to

- A. 0.017
- B. 0.204
- C. 0.452
- D. 0.517
- E. 0.693

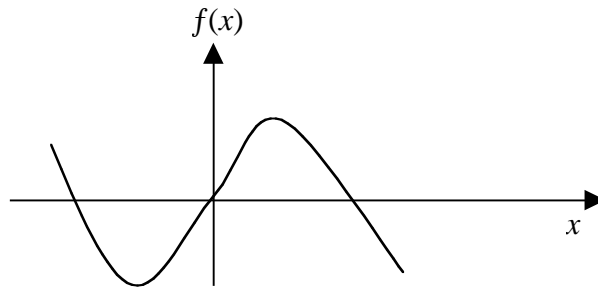
Question 18

If $\frac{dy}{dx} = -7e^{-2x}$ and if $y(0) = 14$ and $y = Ae^{-2x} + B$ then the values of A and B are:

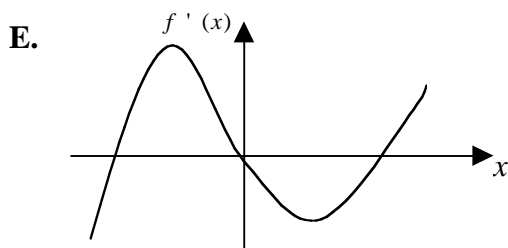
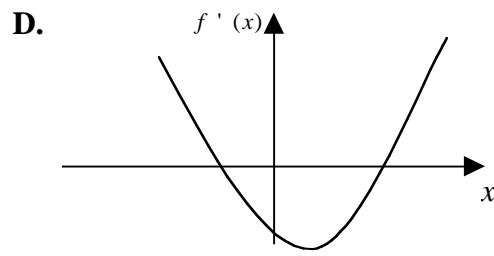
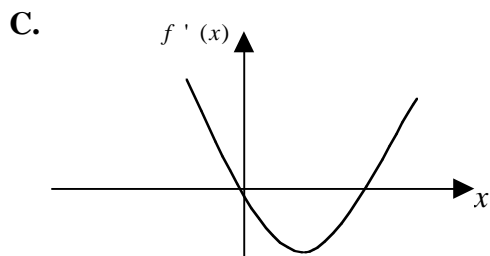
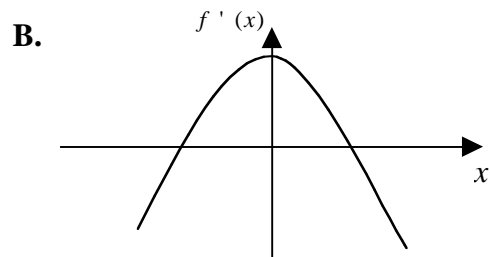
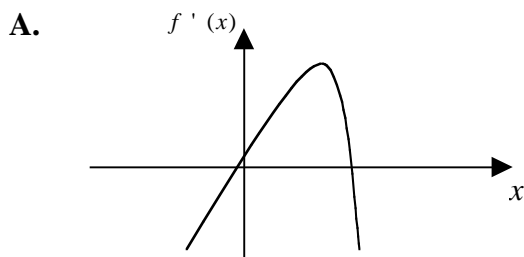
- A. $A = -3.5, B = 17.5$
- B. $A = -3.5, B = 10.5$
- C. $A = 3.5, B = 10.5$
- D. $A = 3.5, B = 3.5$
- E. $A = -3.5, B = 3.5$

Question 19

The graph of the function $y = f(x)$ is shown below.



Which one of the following graphs could represent the gradient function, $y = f'(x)$ of the above graph?



Question 20

Given that $xy - 2 = 0$, $\int_1^3 y dx$ is closest to:

- A. 1
- B. 2
- C. 8
- D. 9
- E. 10

Question 21

If X is a binomial random variable with $n = 10$ and mean = 6, then $\Pr(X = 8)$ is closest to:

- A. 0.011
- B. 0.024
- C. 0.054
- D. 0.121
- E. 0.247

Question 22

x	0	1	2
$\Pr(X = x)$	$\frac{3 - 2a}{4}$	$\frac{3 + 2a}{8}$	$\frac{3 - 2a}{8}$

For the above probability function, the value of a is:

- A. 0
- B. $\frac{1}{8}$
- C. $\frac{1}{4}$
- D. $\frac{3}{8}$
- E. 1

Question 23

A coin is biased so that the probability of getting a head is 0.7. If the coin is tossed four times, the probability of getting at least three heads is closest to:

- A. 0.1
- B. 0.3
- C. 0.5
- D. 0.7
- E. 0.9

Question 24

Let X be a normally distributed random variable with mean 2 and standard deviation 2.5.

If $[\Pr (X) < a) = 0.7]$, then a is closest to:

- A. 2.7
- B. 2.9
- C. 3.3
- D. 3.6
- E. 4.1

Question 25

A hand of thirteen cards is dealt from a pack of 52 cards. The probability that the hand contains one ace is closest to:

- A. 0.08
- B. 0.11
- C. 0.27
- D. 0.31
- E. 0.44

Question 26

If $f(x) = \frac{x}{x^2 - 1}$, then which one of the following is true for all values of x , $x \in \mathbb{R} / \{-1, 1\}$?

- A. $f'(x) < 0$
- B. $f'(x) \leq 0$
- C. $f'(x) \geq 0$
- D. $f(x) < 0$
- E. $f(x) > 0$

Question 27

The region bounded by the X axis and the part of the graph $y = 2 \sin x$ between $x = 0$ and $x = \pi$ is divided into two regions by the line $x = a$. If the area of the region $0 \leq x \leq a$ is $\frac{1}{3}$ of the area of the region $a \leq x \leq \pi$, then the value of a is

- A. $\frac{\pi}{6}$
- B. $\frac{\pi}{4}$
- C. $\frac{\pi}{3}$
- D. $\frac{\pi}{2}$
- E. $\frac{3\pi}{4}$

**END OF PART I
MULTIPLE CHOICE QUESTION BOOK**

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STUDENT NUMBER

Letter

Figures									
Words									

**VICTORIAN CERTIFICATE OF EDUCATION
2002**

MATHEMATICAL METHODS

Trial Written Examination 1 (Facts, skills and applications)

Reading time: 15 minutes
Total writing time: 1 hour 30 minutes

PART II

QUESTION AND ANSWER BOOK

Directions to students

This examination has two parts: Part I (multiple-choice questions) and Part II (short answer questions)

Part I consists of a separate question book and must be answered on the answer sheet provided for multiple-choice questions.

Part II consists of this question and answer book.

You must complete **both** parts in the time allotted. When you have completed one part continue immediately to the other part. A detachable formula sheet for use in both parts is included.

At the end of the task

Place the answer sheet for multiple-choice questions (Part I) inside the front cover of the question and answer book (Part II).

Structure of book

<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
7	7	23

Directions to students

Materials

Question and answer book of 4 pages.

Working space is provided throughout the book.

You may bring to the examination up to four pages (two A4 sheets) of pre-written notes.

You may use an approved scientific and/or graphics calculator, ruler, protractor, set-square and aids for curve sketching

The task

Detach the formula sheet during reading time.

Please ensure that your **student number** is written in the space provided on the cover of this book.

The marks allotted to each question are indicated at the end of the question.

There is a total of 23 marks available for Part II.

You need not give numerical answers as decimals unless instructed to do so. Alternative forms may involve, for example, π , e , surds or fractions.

Where an exact answer is required to a question, appropriate working must be shown and calculus must be used to evaluate derivatives and definite integrals.

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

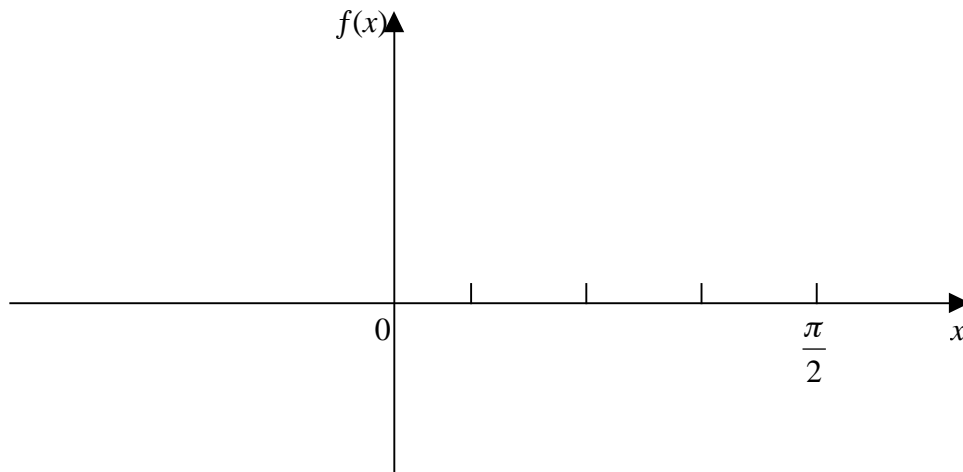
All written responses should be in English.

At the end of the task

Place the answer sheet for multiple-choice questions (Part I) inside the front cover of this question and answer book (Part II).

Specific Instructions to studentsAnswer **all** questions in this part in the spaces provided.**Question 1**

- a. On the axes below, sketch the graph of the function with equation $f(x) = -\tan 4x$, $0 \leq x \leq \frac{\pi}{2}$.
Clearly label any asymptotes with their equations and mark any points of intersection with the axes.



- b. State the range of $f(x)$
-

- c. What transformation would need to be performed on the graph above to change it into the graph of $f(x) = \tan 4x$?
-

(2 + 1 + 1 = 4 marks)

Question 2

a. Expand $(2\sqrt{x} + 1)^3$.

b. Hence, express $\frac{(2\sqrt{x} + 1)^3}{2\sqrt{x}}$ as the sum of four terms.

(2 + 1 = 3 marks)

Question 3

a. Find the gradient of the tangent to the curve $y = 2x^2 - 2x + 3$ at the point where $x = 1$.

b. Find the obtuse angle that this tangent line makes with the X axis, giving your answer to the nearest degree.

(2 + 1 = 3 marks)

Question 4

a. If $f(x) = \sqrt{2x - 2}$, state the domain and range.

b. Find $f^{-1}(x)$.

c. State the domain and range of $f^{-1}(x)$.

(1 + 2 + 1 = 4 marks)

Question 5

In a group of 20 people there are 5 A grade squash players and 6 B grade squash players. The remainder of the group does not play squash. If a randomly selected group of 3 is chosen from the total group, what is the probability that one will be an A grade player, one will be a B grade player and one will not play squash? Give your answer to three decimal places.

(2 marks)

Question 6

Find $g(x)$ if $f(x) = g'(x)$ where $f(x) = \cos \frac{5x}{2} - 2 \sin 3x$ and $g(x) = 1$ when $x = 0$.

(3 marks)

Question 7

a. If $f(x) = 3e^{-\frac{x}{2}} \cos(2x)$, for what values of x does $f(x) = 0$, $0 \leq x \leq 2\pi$?

b. Use calculus to show that $y = e^{\frac{1}{x}}$ is a decreasing graph for all values of x , $x \neq 0$.

(2 + 2 = 4 marks)

**End of
2002 Mathematical Methods Trial Examination 1 Part II
Question and Answer Book**

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