Year 2003

VCE

Mathematical Methods

Trial Examination 1

KILBAHA PTY LTD (Publishers in Education) **ABN 47 065 111 373** **PO BOX 2227 KEW VIC 3101** **AUSTRALIA**	**TEL: (03) 9817 5374** **FAX: (03) 9817 4334** **chemas@chemas.com** www.chemas.com

VICTORIAN CERTIFICATE OF EDUCATION
2003

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

Number of questions	*Number of questions to be answered*	*Number of marks*
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 2003
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

$$\frac{d}{dx}\left(x^n\right) = nx^{n-1} \qquad \int x^n dx = \frac{1}{n+1}x^{n+1} + c, n \neq -1$$

$$\frac{d}{dx}\left(e^{ax}\right) = ae^{ax} \qquad \int e^{ax}dx = \frac{1}{a}e^{ax} + c$$

$$\frac{d}{dx}\left(\log_e x\right) = \frac{1}{x} \qquad \int \frac{1}{x}dx = \log_e x + c, \text{for } x > 0$$

$$\frac{d}{dx}(\sin ax) = a\cos ax \qquad \int \sin ax\ dx = -\frac{1}{a}\cos ax + c$$

$$\frac{d}{dx}(\cos ax) = -a\sin ax \qquad \int \cos ax\ dx = \frac{1}{a}\sin ax + c$$

$$\frac{d}{dx}(\tan ax) = \frac{a}{\cos^2 ax} = a\sec^2 ax$$

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: $\mu = \mathrm{E}(X)$

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

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

Table 1 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 function $f:[0,2\pi] \to R$, $f(x) = 4\cos(3x - \frac{\pi}{2}) - 1$ has a range of

A. R^+

B. [0,3]

C. [−4,4]

D. [−5,3]

E. [3,3]

Question 2

On a particular day the height of waves, *y*, can be modeled by a trigonometric equation $y = y(t)$ where *t* is the time in hours after midnight. If the maximum height of 2 metres occurs at 2.00AM and the minimum height of 1.5 metres occurs at 6.00AM then $y(t)$ equals

A. $1.3 + 0.7\cos\left(\frac{\pi(t-2)}{4}\right)$

B. $1.75 + 0.25\cos\left(\frac{\pi(t+2)}{4}\right)$

C. $1.75 + 0.25\sin\left(\frac{\pi t}{4}\right)$

D. $1.75 + 0.25\sin\left(\frac{\pi(t+2)}{4}\right)$

E. $1.8 + 0.2\cos\left(\frac{\pi(t-2)}{4}\right)$

Question 3

The sum of the solutions of the equation $\sqrt{2}\cos^2 x + \cos x = \sqrt{2}$ in the interval $[0, 2\pi]$ is

A. $\frac{\pi}{2}$

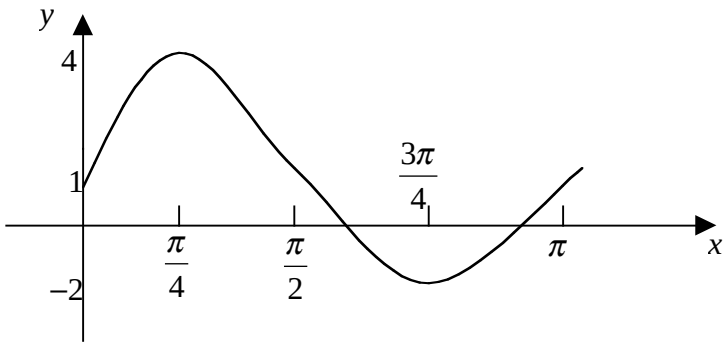
B. $\frac{3\pi}{4}$

C. π

D. $\frac{3\pi}{2}$

E. 2π

Question 4



A possible equation for the function whose graph is shown above is

A. $y = 3\cos 2(x - \frac{\pi}{4}) + 1$

B. $y = 3\sin 2(x - \frac{\pi}{4}) + 1$

C. $y = 4\cos 2(x + \frac{\pi}{4})$

D. $y = 3\sin(x + \frac{\pi}{4}) + 1$

E. $y = 3\cos 2(x + \frac{\pi}{4}) + 1$

.

Question 5

The coefficient of x^2 in the expansion of $(2x-3)^7$ is

A. 288

B. −288

C. −1701

D. 6048

E. −20412

Question 6

If $2\log_e x - \log_e 2x = q$ then x equals

A. e^{q^2}

B. $2e^{q}$

C. e^{2q}

D. 2

E. $\frac{1}{2}$

Question 7

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$f(x) = g(x) + h(x)$ where $h(x)$ is defined over the domain[-4,4] and $f(x)$ is defined over the domain (0,4]
The domain of $g(x)$ could be

A. [−4,0)

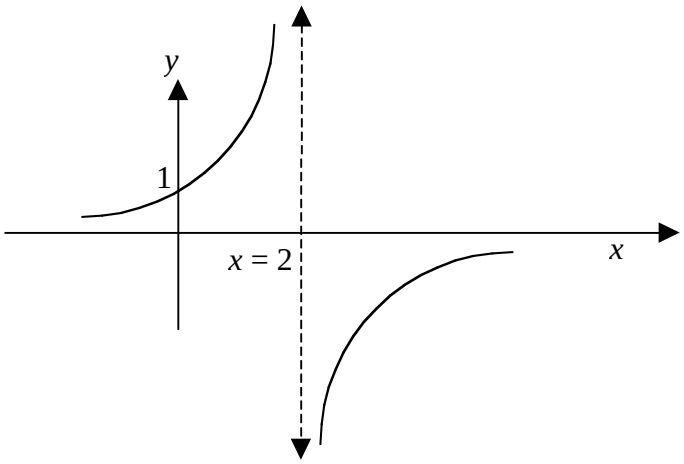
B. [−4,4]

C. (0,4)

D. (−4,0]

E. (0,6]

Question 8



To obtain the graph above, the graph of $y = \frac{1}{x}$ could be

A. Reflected in the *Y* axis and dilated by a factor of $\frac{1}{2}$

B. Reflected in the *Y* axis and dilated by a factor of 2

C. Reflected in the *X* axis, translated 2 units to the right and dilated by a factor of 2

D. Reflected in the *X* axis, translated 2 units to the right and dilated by a factor of $\frac{1}{2}$

E. Reflected in the *X* axis and translated 2 units to the right

Question 9

If $f:[a,3] \rightarrow R$ where $f(x) = 4 - x^2$ then the smallest real value for a so that f has an inverse function is

A. $-\infty$

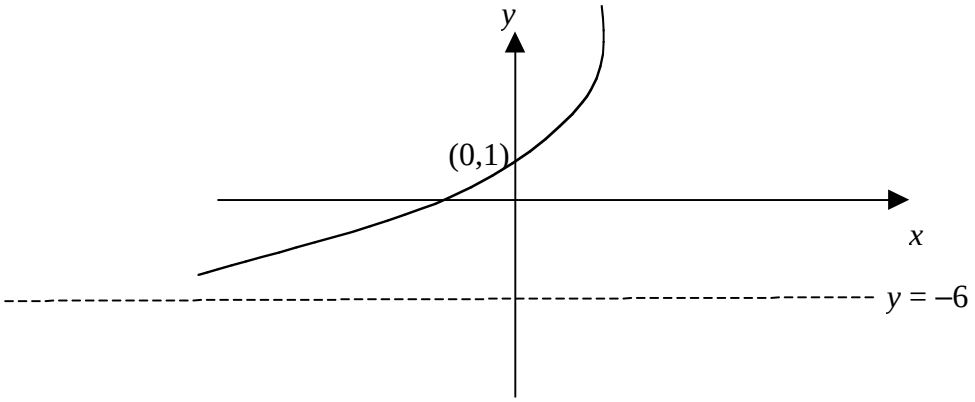
B. –3

C. 0

D. 2

E. 4

Question 10



If the equation of the above graph is of the form $y = a + be^x$ then the values of a and b respectively are

	a	***b***
A.	1	6
B.	6	1
C.	–6	7
D.	–6	–7
E.	6	7

Question 11

If $e^x = 1 + 4e^{-x}$ the value of x is closest to

A. 0.9400

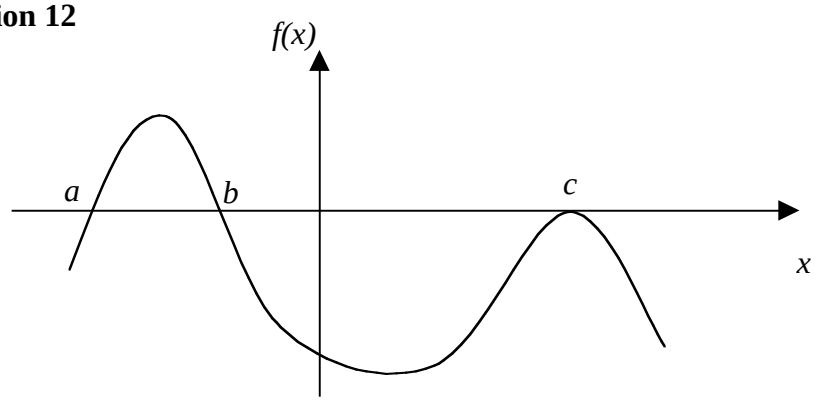
B. 0.9401

C. 0.9406

D. 1.1188

E. 2.5616

Question 12



The equation of the above graph could be

A. $f(x) = (x-a)(x-b)(x+c)$

B. $f(x) = (x-a)(x-b)(x+c)^2$

C. $f(x) = (x-a)(x-b)(x-c)^2$

D. $f(x) = (x+a)(x+b)(x-c)^2$

E. $f(x) = (x-a)(b-x)(x-c)^2$

Question 13

If $y = \log_e(3x^2+5)$ then $\frac{dy}{dx}$ equals

A. $\frac{2}{x+5}$

B. $\frac{1}{3x^2+5}$

C. $\frac{x}{3x^2+5}$

D. $\frac{6x}{3x^2+5}$

E. $\frac{1}{3x}$

Question 14

If $y = x - 7$ is a tangent to the curve $y = x^2 + c$, then the value of c and the point of tangency respectively are

	c	Point of tangency
A.	$-\frac{27}{4}$	$\left(\frac{1}{2}, \frac{13}{2}\right)$
B.	$-\frac{27}{4}$	$\left(\frac{1}{2}, \frac{-13}{2}\right)$
C.	$\frac{27}{4}$	$\left(\frac{1}{2}, \frac{13}{2}\right)$
D.	$\frac{27}{4}$	$\left(\frac{1}{2}, \frac{-13}{2}\right)$
E.	$-\frac{27}{4}$	$\left(\frac{-1}{2}, \frac{-13}{2}\right)$

Question 15

If $y = x^2 \cos 2x$, then the rate of change of y with respect to x when $x = \pi$ is

A. π

B. 2π

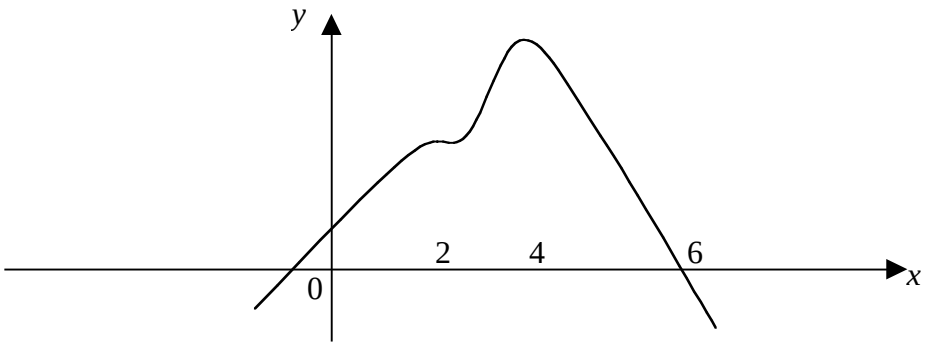
C. $2\pi - 2\pi^2$

D. 4π

E. 0

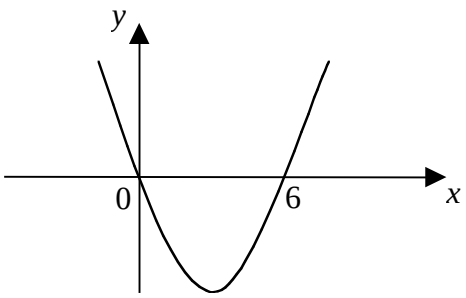
Question 16

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

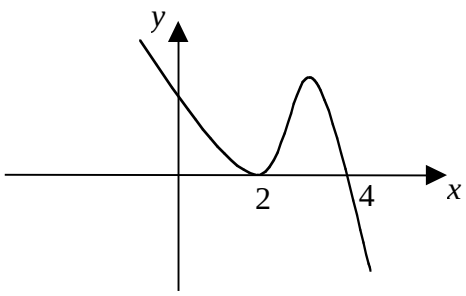


Which one of the following is most likely to be the graph of the function with the rule $y = f'(x)$?

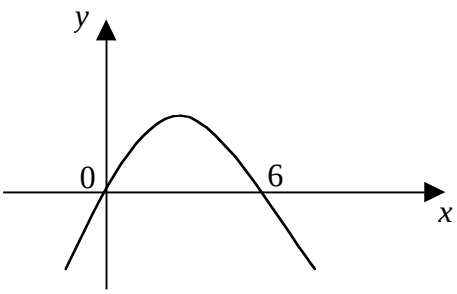
A.



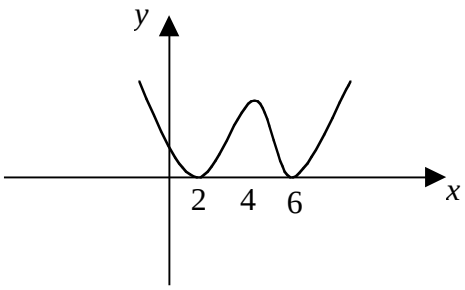
B.



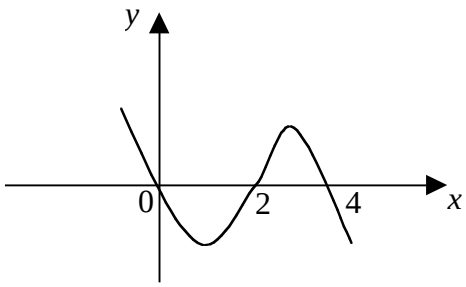
C.



D.

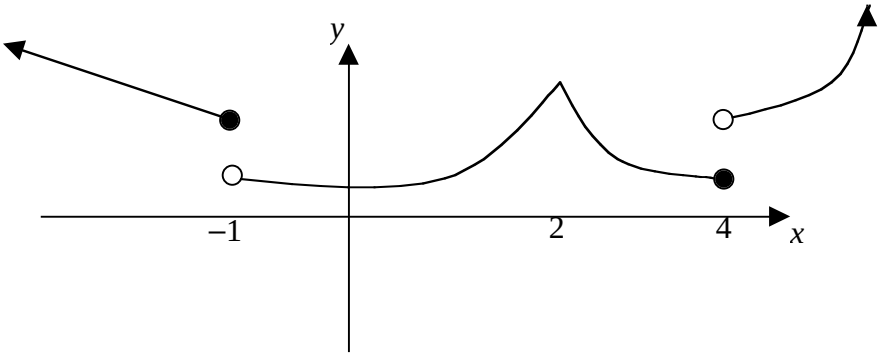


E.



Question 17

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



The domain of the function $y = f'(x)$ is

A. R

B. $R \setminus \{-1,2,4\}$

C. $R \setminus \{-1,4\}$

D. $R \setminus \{2\}$

E. R^+

Question 18

The graph of $y = -x^3 + 2x^2 + 7x + 4$ has

A. a local maximum at $(-1,0)$

B. a gradient of 4 when $x = 0$

C. a stationary point of inflexion at $\left(0, \frac{7}{3}\right)$

D. a positive gradient for all values of x

E. a positive gradient for $-1 < x < \frac{7}{3}$

Question 19

If $\frac{dy}{dx} = \frac{1}{2x+1}$ and c is a real constant, then y is equal to

A. $\log_e(2x+1)+c$

B. $2\log_e(2x+1)+c$

C. $\frac{1}{2}\log_e(2x+1)+c$

D. $\log_e(2x)+c$

E. $2\log_e(2x)+c$

Question 20

If $f'(x) = 3e^{\pi}\sin\frac{x}{4}$ and c is a real constant then $f(x)$ is equal to

A. $\frac{3}{4}e^{\pi}\sin\frac{x}{4}+c$

B. $-\frac{3}{4}e^{\pi}\sin\frac{x}{4}+c$

C. $12e^{\pi}\cos\frac{x}{4}+c$

D. $-12e^{\pi}\cos\frac{x}{4}+c$

E. $12e^{\pi}\left(\cos\frac{x}{4}+\sin\frac{x}{4}\right)+c$

Question 21

An approximation for the area enclosed by the graph of $f(x) = x^2 + 3$ the X axis and the ordinates $x = 1$ and $x = 2$, using the trapezoidal method with interval width of 0.5 is

A. 2.75

B. 3.779

C. 4.0625

D. 5.375

E. 8.125

Question 22

The area between the graph of $y = e^{2x}$, the X axis and the ordinates $x = 3$ and $x = a$ where $a > 3$ is 21623.037. The value of a is closest to

A. 4

B. 5

C. 7

D. 10

E. 11

Question 23

The following table represents a discrete probability distribution.

x	-2	-1	a	$a+4$
$\Pr(X=x)$	0.2	0.3	b	0.1

If the mean value of the distribution is 1.2, then the values of a and b respectively are:

	a	b
A.	2	0.4
B.	4	0.4
C.	4	0.3
D.	3	0.4
E.	3	0.3

Question 24

A random variable X has a normal distribution with mean 10 and standard deviation 4. If the probability that $X < a$ equals the probability that the standard random variable $Z < 1.5$, then the value of a is closest to

A. 12

B. 14

C. 16

D. 18

E. 20

Question 25
A bag contains six apples, two of which are green and the remainder red. Sue draws two apples at random from the bag without replacement. The probability that at least one of these two apples is green is closest to

A. 0.4

B. 0.5

C. 0.6

D. 0.7

E. 0.8

Question 26
The life time of Condor Calculators is observed to be a normal distribution with mean of 3 years and a standard deviation of $\frac{1}{2}$ a year. The percentage of all condor calculators that last for more than 4 years is closest to

A. 2%

B. 10%

C. 30%

D. 50%

E. 98%

Question 27
A hockey player has a 40% chance of scoring a goal with each shot for goal. Assuming that the results of each shot for goal are independent, then the probability that the hockey player scores exactly one goal from three shots at goal is closest to

A. 0.10

B. 0.15

C. 0.29

D. 0.43

E. 0.48

END OF PART I
MULTIPLE CHOICE QUESTION BOOK

VICTORIAN CERTIFICATE OF EDUCATION
2003

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

Number of questions	*Number of questions to be answered*	*Number of marks*
8	8	23

Directions to students

Materials

Question and answer book of 6 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** 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 students

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

Question 1

Find the domain and range of the function $f(x) = -\frac{1}{2}\sqrt{2x-3}+4$

(2 marks)

Question 2

Simplify $\frac{\log_a 16 - \log_a 2}{\log_a 2}$.

(2 marks)

Question 3

If $\cos\theta = \frac{7}{25}$ and $\frac{3\pi}{2} < \theta < 2\pi$ find the exact value of $\tan\theta$

(2 marks)

Question 4

If $f(x) = 3\sin\frac{x}{3} \quad 0 \le x \le 8\pi$

a. Find $f'(x)$

b. Find the minimum value of $f(x)$ and the smallest value of x for which this minimum occurs.

(1 + 2 = 3 marks)

Question 5

For the graph of $y = 5 - 4(3 - 2x)^2$

a. Find the turning point

b. State the transformations required to change the graph of $y = x^2$ into this graph.

(1 + 4 = 5 marks)

Question 6

The probability distribution of throwing a die is given below

x	1	2	3	4	5	6
$\Pr(X=x)$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

a. Find the expected value of X

b. Find the 95% confidence intervals for this distribution. Give your answer to one decimal place.

(1 + 2 =3 marks)

Question 7

My sister has a collection of 30 CDs and I do not like 6 of them. At her party tonight she is going to select 10 CDs to play. What is the probability that I will dislike less than 2 of the CDs she plays at the party? Give your answer to 4 decimal places.

(3 marks)

Question 8

a. Find the derivative of $y = e^{\cos x}$

b. HENCE, find the exact value of $\int_0^{\frac{\pi}{2}} \sin x e^{\cos x} dx$

(1+2=3 marks)

End of 2003 Mathematical Methods Trial Examination 1
Question and Answer Book

KILBAHA PTY LTD (Publishers in Education) **ABN 47 065 111 373** **PO BOX 2227 KEW VIC 3101** **AUSTRALIA**	**TEL: (03) 9817 5374** **FAX: (03) 9817 4334** **chemas@chemas.com** www.chemas.com