VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education
2002

MATHEMATICAL METHODS

Written examination 1

(Facts, skills and applications)

Friday 8 November 2002

Reading time: 9.00 am to 9.15 am (15 minutes)
Writing time: 9.15 am to 10.45 am (1 hour 30 minutes)

PART I
MULTIPLE-CHOICE QUESTION BOOK

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.

Structure of book

Number of questions	*Number of questions to be answered*	*Number of marks*
27	27	27

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers, a protractor, set-squares, aids for curve sketching, up to four pages (two A4 sheets) of pre-written notes (typed or handwritten) and an approved scientific and/or graphics calculator (memory may be retained).
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.

Materials supplied
- Question book of 14 pages, with a detachable sheet of miscellaneous formulas in the centrefold.
- Answer sheet for multiple-choice questions.

Instructions
- Detach the formula sheet from the centre of this book during reading time.
- Check 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.
- Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

At the end of the examination
- 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.

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

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Instructions for Part I

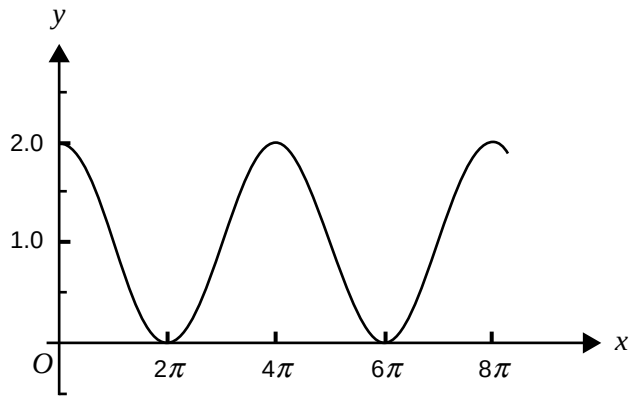
Answer **all** questions in pencil, on the answer sheet provided for multiple-choice questions. A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No mark will be given if more than one answer is completed for any question.

Question 1

The diagram below shows part of the graph of a circular function.



A possible equation for the rule of the function whose graph is shown is

A. $y = 1 + \sin(x)$

B. $y = 1 + \sin\left(\frac{x}{2}\right)$

C. $y = 1 + \cos(x)$

D. $y = 1 - \cos\left(\frac{x}{2}\right)$

E. $y = 1 + \cos\left(\frac{x}{2}\right)$

Question 2

For the equation $\sin(2x) = 1$, the sum of the solutions in the interval $[0, 4\pi]$ is

A. $\frac{\pi}{4}$

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

C. 3π

D. 6π

E. 7π

Question 3

On a particular day, the temperature y, in degrees celsius, can be modelled by the function with equation $y = 18 - 5\sin\left(\frac{\pi t}{12}\right)$, where t is the time in hours after midnight.

The maximum temperature for this particular day occurs at

A. 3.00 am.

B. 6.00 am.

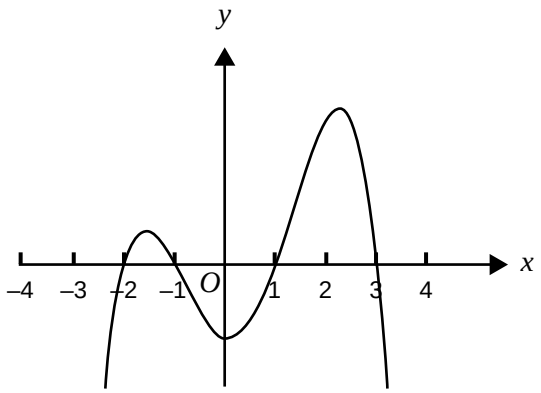
C. 12.00 noon.

D. 6.00 pm.

E. 12.00 midnight.

Question 4

The diagram below shows part of the graph of a polynomial function.



A possible equation for the rule of the function is

A. $y = -(x + 2)(x + 1)(x - 1)(x + 3)$

B. $y = (x - 2)(x - 1)(x + 1)(x + 3)$

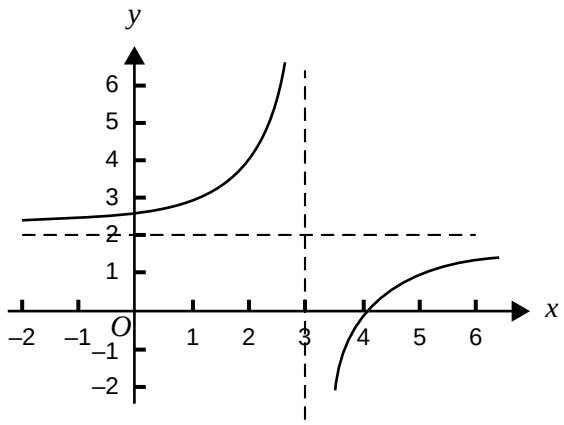
C. $y = (2 - x)(x - 1)(x + 1)(x + 3)$

D. $y = (x + 2)(x + 1)(x - 1)(x - 3)$

E. $y = (x + 2)(x + 1)(x - 1)(3 - x)$

Question 5

Part of the graph of the function with equation $y = \frac{a}{x+b} + c$ is shown below.

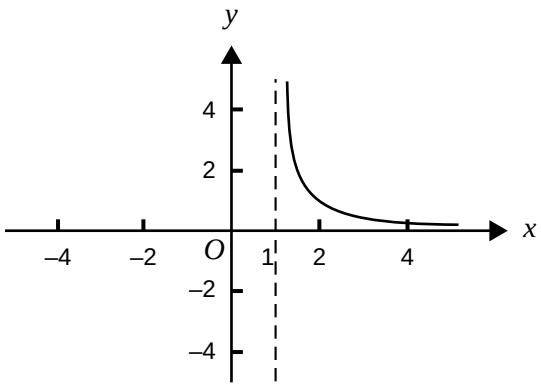


The values of a, b and c respectively are

	a	b	c
A.	2	3	2
B.	2	–3	2
C.	–2	–3	2
D.	–2	–2	3
E.	2	–2	3

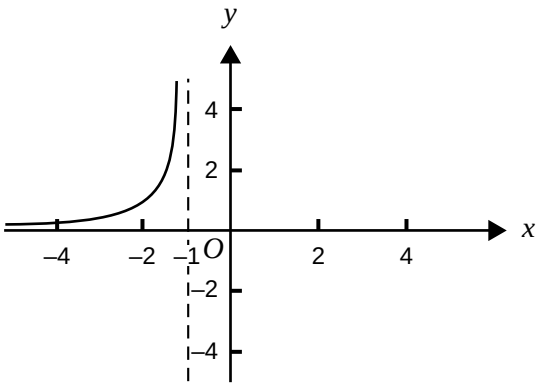
Question 6

Part of the graph of the function with rule $y = f(x)$ is shown below.

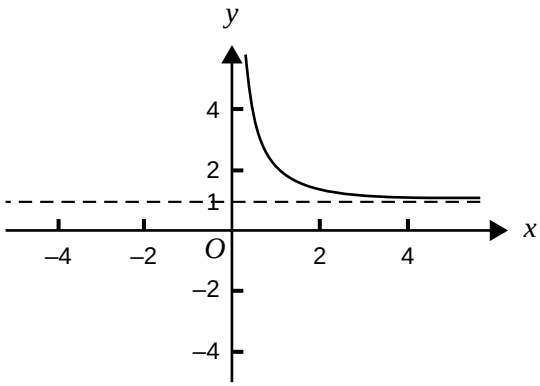


Which one of the following is most likely to be the corresponding part of the graph of the function with rule $y = f(-x)$?

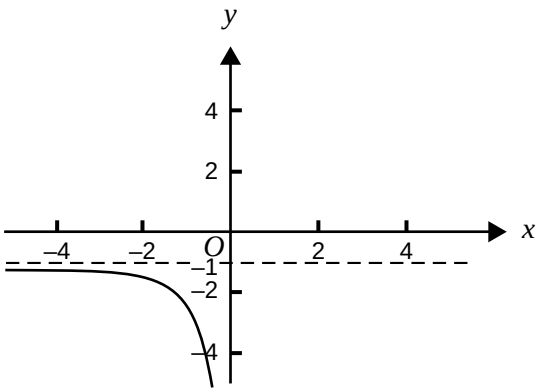
A.



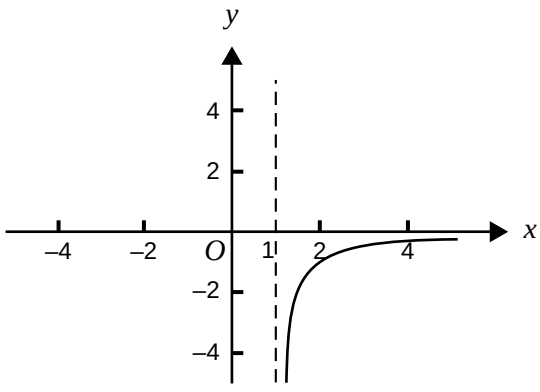
B.



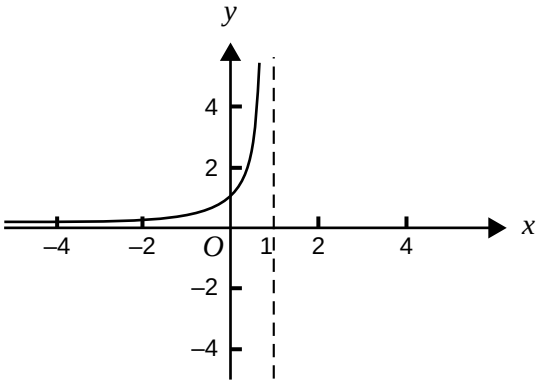
C.



D.

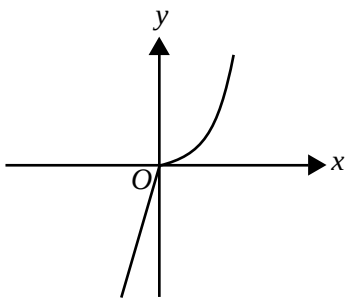


E.



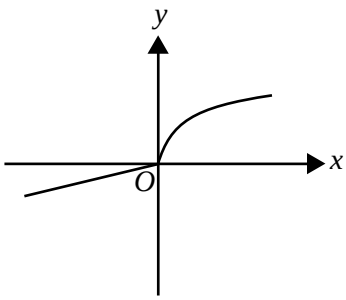
Question 7

The graph of the function g with rule $y = g(x)$ is shown below.
(A one-to-one scale has been used.)

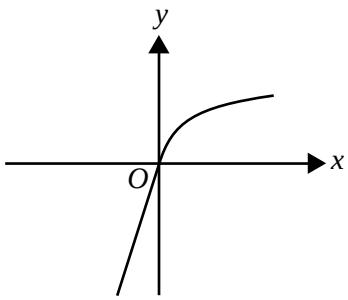


Which one of the following is most likely to be the graph of the inverse function of g?
(A one-to-one scale has been used.)

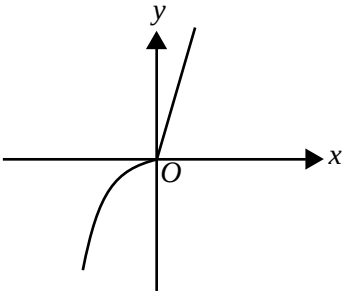
A.



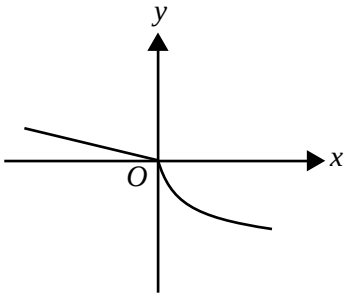
B.



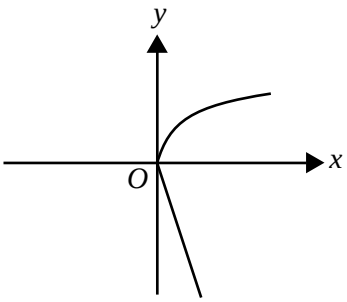
C.



D.



E.



Question 8

This question refers to the data shown in the table below.

x	1	2	3	4	5	6	7	8
y	1.6	2.6	4.3	7.0	11.3	18.4	29.9	48.5

The data would be best modelled using

A. a linear function.

B. a power function.

C. an exponential function.

D. a circular function.

E. a logarithmic function.

Question 9

The **linear** factors of $x^4 + x^3 - 3x^2 - 3x$ over R are

A. $x, x + 1, x^2 - 3$

B. $x, x + 1, x + \sqrt{3}, x - \sqrt{3}$

C. $x, x + 1$

D. $x + 1, x + \sqrt{3}, x - \sqrt{3}$

E. $x + 1, x^3 - 3x$

Question 10

The expression $2^{\log_2(x + 5)}$ can be simplified to

A. $x + 5$

B. $\log_2(x) + \log_2(5)$

C. $2^x + 2^5$

D. $2(x + 5)$

E. $5x$

Question 11

Which one of the following functions is **not** a one-to-one function?

A. $f: R \to R, f(x) = e^x$

B. $f: R^+ \to R, f(x) = \log_e(x)$

C. $f: R \setminus \{0\} \to R, f(x) = \frac{1}{x}$

D. $f: R \to R, f(x) = \sin(x)$

E. $f: R \to R, f(x) = x^3$

Question 12

The function f defined by $f: A \to R$, where $f(x) = (x - 3)^2 + 2$, will have an inverse function if its domain A is

A. R

B. $R^+ \cup \{0\}$

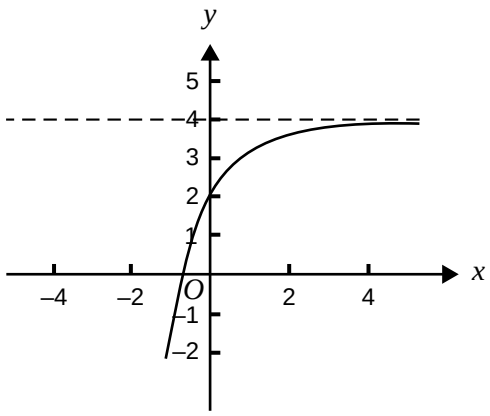
C. $\{x: x \geq 2\}$

D. $\{x: x \leq 3\}$

E. $\{x: x \leq 11\}$

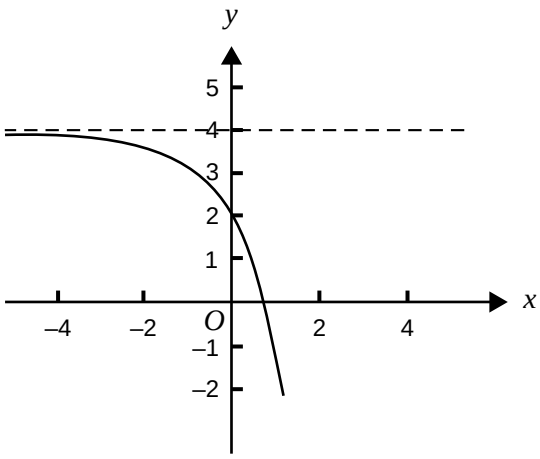
Question 13

Part of the graph of the function f, with rule $y = f(x)$, is shown below.

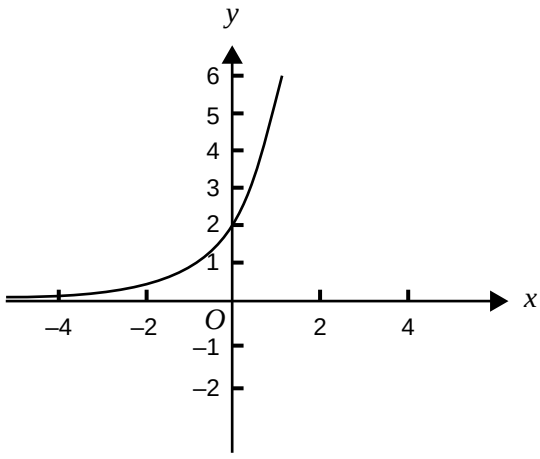


Which one of the following is most likely to be the corresponding part of the graph of the function with rule $y = f'(x)$?

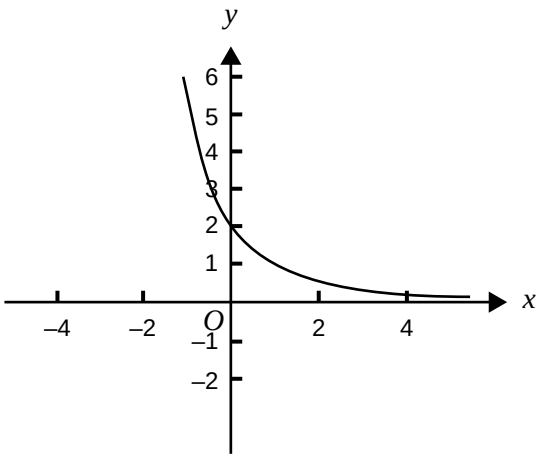
A.



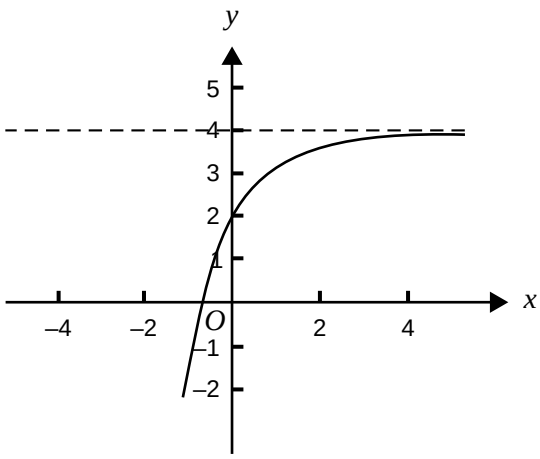
B.



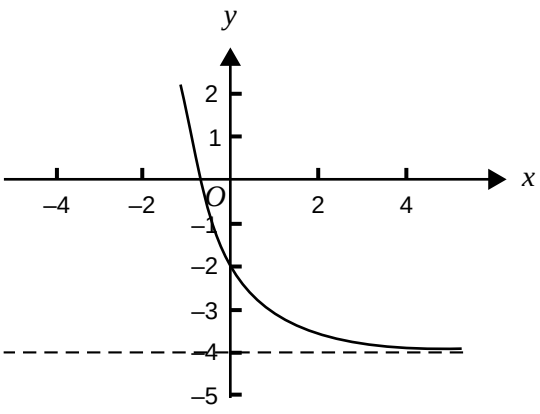
C.



D.



E.



Question 14

If $y = \log_e(\cos(2x))$, then $\frac{dy}{dx}$ is equal to

A. $2\tan(2x)$

B. $-2\tan(2x)$

C. $\frac{1}{\cos(2x)}$

D. $\frac{-1}{2\sin(2x)}$

E. $-2\sin(2x)$

Question 15

The equation of the **normal** to the curve with equation $y = x\sin(x)$, at the point on the curve with x-coordinate π, is

A. $y = -\pi(x - \pi)$

B. $y = \pi(x - \pi)$

C. $y = -\frac{1}{\pi}(x - \pi)$

D. $y = \frac{1}{\pi}(x - \pi)$

E. $y = \frac{-1}{x\sin(x)}$

Question 16

If $y = e^{-x} - 1$, then the rate of change of y with respect to x when $x = 0$ is

A. $-e$

B. -2

C. -1

D. 0

E. $e - 1$

Question 17

Using the approximation formula, $f(x + h) \approx f(x) + h f'(x)$ where $f(x) = x^2$ with $x = 3$, an approximate value for 3.02^2 is given by

A. $f(3) + 0.02 f'(3)$

B. $f(9) + 0.04 f'(9)$

C. $f(3)$

D. $f(3) - 0.02 f'(3)$

E. $f(9) - 0.04 f'(9)$

Question 18

A continuous function f has the following properties.

$f(0) = 0$ $\quad f'(0) = 0$

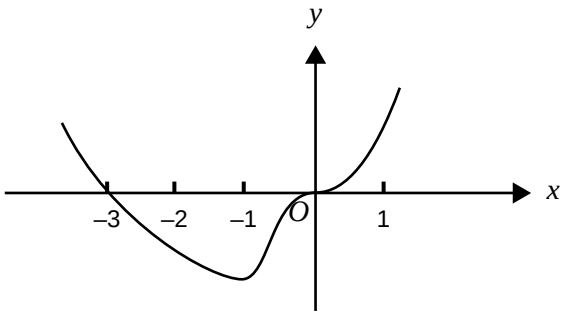
$f(-3) = 0$ $\quad f'(-1) = 0$

$f'(x) > 0 \quad \text{for} \quad \{x : x < -1\}$

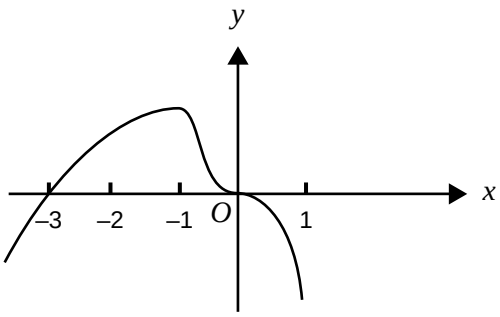
$f'(x) < 0 \quad \text{for} \quad \{x : x > -1\} \setminus \{0\}$

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

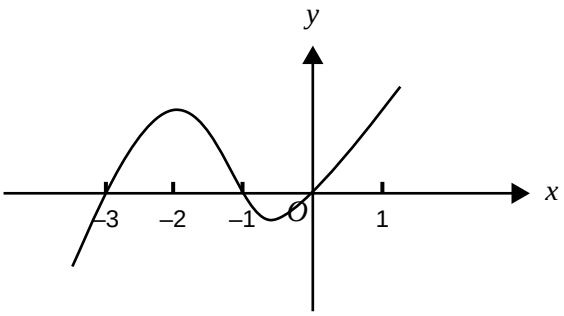
A.



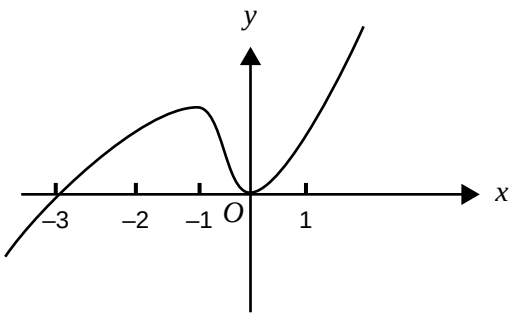
B.



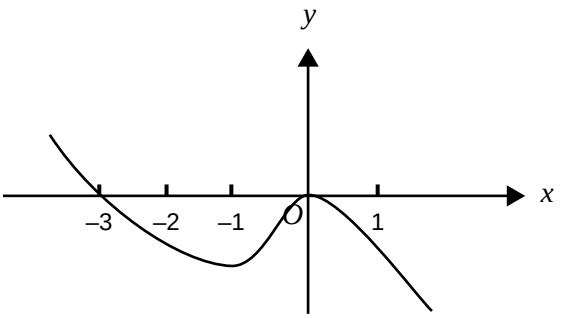
C.



D.



E.



Question 19

The **right** rectangle approximation with rectangles of width 1, for the area of the region bounded by the *x*-axis, the *y*-axis, the line $x = 3$ and the curve $y = \sqrt{(1+x)}$, is

A. $\sqrt{2} + \sqrt{3} + 2$

B. $1 + \sqrt{2} + \sqrt{3}$

C. $1 + \sqrt{2} + \sqrt{3} + 2$

D. $\frac{2}{3}\left(4^{\frac{3}{2}} - 1\right)$

E. $\frac{1}{2}\left(\frac{1}{2} - 1\right)$

Question 20

If $f'(x) = 2\cos(5x)$ and c is a real constant, then $f(x)$ is equal to

A. $-\frac{2}{5}\sin(5x) + c$

B. $\frac{2}{5}\sin(5x) + c$

C. $-10\sin(5x) + c$

D. $10\sin(5x) + c$

E. $-2\sin\left(\frac{5x^2}{2}\right) + c$

Question 21

If $\frac{dy}{dx} = \frac{3}{(2x+1)^{\frac{1}{2}}}$ and c is a real constant, then y is equal to

A. $\frac{3(2x+1)^{\frac{1}{2}}}{4} + c$

B. $3(2x+1)^{\frac{1}{2}} + c$

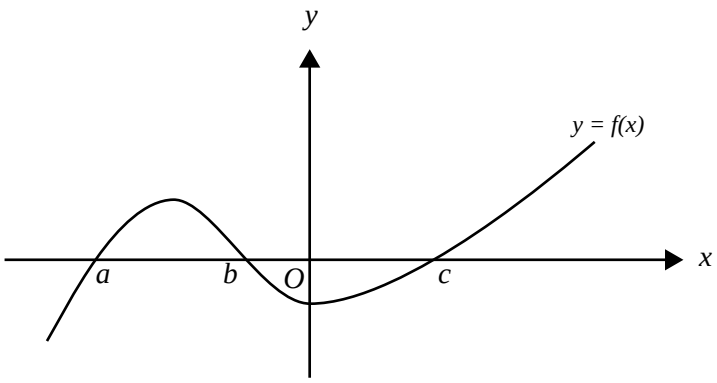
C. $\frac{3(2x+1)^{\frac{1}{2}}}{2} + c$

D. $\frac{-9}{4(2x+1)^{\frac{3}{2}}} + c$

E. $\frac{-3}{(2x+1)^{\frac{3}{2}}} + c$

Question 22

Part of the graph of the function f is shown below.



The total area, bounded by the curve of $y = f(x)$ and the x-axis on the interval $[a, c]$, is given by

A. $\int_a^c f(x)\,dx$

B. $\int_a^b f(x)\,dx + \int_b^c f(x)\,dx$

C. $-\int_a^0 f(x)\,dx + \int_0^c f(x)\,dx$

D. $\int_a^b f(x)\,dx + \int_c^b f(x)\,dx$

E. $\int_a^b f(x)\,dx - \int_b^0 f(x)\,dx + \int_0^c f(x)\,dx$

Question 23

Which one of the following random variables is a discrete random variable?

A. The area of a park in Victoria.

B. The height of a child in a preschool in Victoria.

C. The time it takes a student to walk three kilometres to school.

D. The number of goals scored by a team in a football match.

E. The weight of a newborn baby in a hospital in Victoria.

Question 24

A bag contains twenty casino chips which are used to represent cash. Five chips have a value of $10 and the remainder have a value of $5.

If four casino chips are drawn at random from the bag without replacement, what is the probability that there will be at least one chip of value $10?

A. $1-\frac{{}^{15}C_4}{{}^{20}C_4}$

B. $\frac{{}^{5}C_1 \times {}^{15}C_3}{{}^{20}C_4}$

C. $\frac{1}{4}$

D. $1-\left(\frac{3}{4}\right)^4$

E. ${}^{4}C_1 \times \left(\frac{1}{4}\right) \times \left(\frac{3}{4}\right)^3$

Question 25

The number of defective computer parts, in a box of computer parts ready for sale, is a random variable with a binomial distribution with mean 10 and standard deviation 3.

If a computer part is drawn at random from the box, the probability that it is defective is

A. 0.1

B. 0.3

C. 0.5

D. 0.7

E. 0.9

Question 26

The random variable X has a normal distribution with mean 4.7 and standard deviation 1.2.

If Z has the standard normal distribution, then the probability that X is less than 3.5 is equal to

A. $\Pr(Z < 1)$

B. $\Pr(Z > 1)$

C. $1 - \Pr(Z < -1)$

D. $\Pr(Z > -1)$

E. $\Pr(-1 < Z < 1)$

Question 27

Black Mountain coffee is sold in packets labelled as being of 250 grams weight. The packing process produces packets whose weight is normally distributed with a standard deviation of 3 grams.

In order to guarantee that only 1% of packets are under the labelled weight, the actual mean weight (in grams) would be required to be closest to

A. 243

B. 247

C. 250

D. 254

E. 257

END OF QUESTION BOOK

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

Victorian Certificate of Education 2002

STUDENT NUMBER

Figures									Letter
Words									

MATHEMATICAL METHODS

Written examination 1
(Facts, skills and applications)

Friday 8 November 2002

Reading time: 9.00 am to 9.15 am (15 minutes)
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PART II
QUESTION AND ANSWER BOOK

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Instructions for Part II

Answer all questions in the spaces provided.

A decimal approximation will not be accepted if an exact answer is required to a question.

Where an exact answer is required to a question, appropriate working must be shown.

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

Question 1

When a fair coin is tossed, the probability of a head is equal to the probability of a tail.

a. Write down the probability distribution of the number of heads in three tosses of a fair coin, by completing the table below.

Number of heads X	Probability Pr ($X = x$)
0	
1	
2	
3	

b. Find the expected number of heads in three tosses of a fair coin.

2 + 1 = 3 marks

Question 2

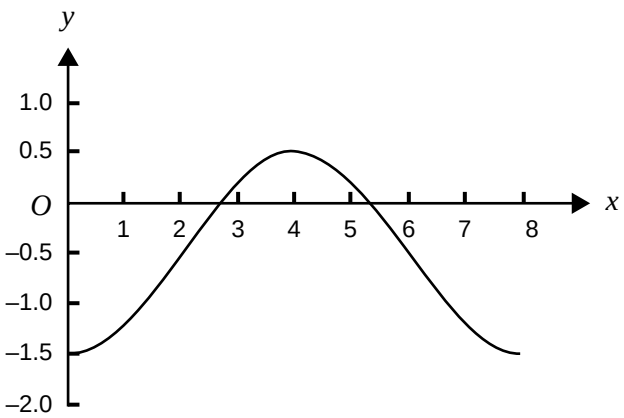
In a quality control procedure, a random sample of five motor car alarms is selected at random without replacement from a batch of 100 and tested. The batch is rejected if any of the five alarms is found to be defective.

A particular batch of 100 motor car alarms, which contains five defectives, is subjected to this quality control procedure. Find the probability, correct to three decimal places, that the batch is accepted.

2 marks

Question 3

The diagram below shows one cycle of the graph of a circular function.



a. State the period of the function.

b. State the amplitude of the function.

1 + 1 = 2 marks

Question 4

a. Solve $2 \times 2^{-2x} = 2002$ for x, correct to three decimal places.

b. Simplify, by writing $2 \log_e(3x + 1) - \log_e(x)$ as a single logarithm expression to base e.

1 + 1 = 2 marks

Question 5

The graph of the function with rule $y = \frac{1}{x}$ is transformed as follows:

a dilation by a factor of $\frac{1}{2}$ from the *y*-axis

a reflection in the *y*-axis

a translation of +3 units parallel to the *x*-axis

a translation of +1 unit parallel to the *y*-axis.

a. Write down the equation of the rule of the transformed function.

b. Hence state the domain and range of the transformed function.

1 + 2 = 3 marks

Question 6

Given $f: \left[0, \frac{\pi}{2}\right] \to R,\ f(x) = 2\sin(3x) - 1$, find

a. the values of *x* for which $f(x) = -0.5$, correct to three decimal places.

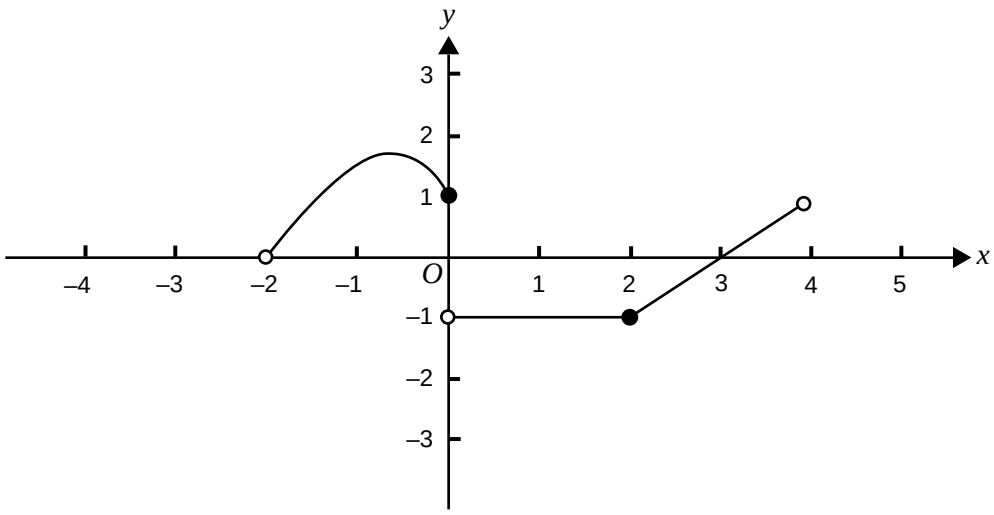
b. the value of $f'(x)$ when $x = 1$, correct to three decimal places.

c. the interval over which the rate of change is positive, correct to three decimal places.

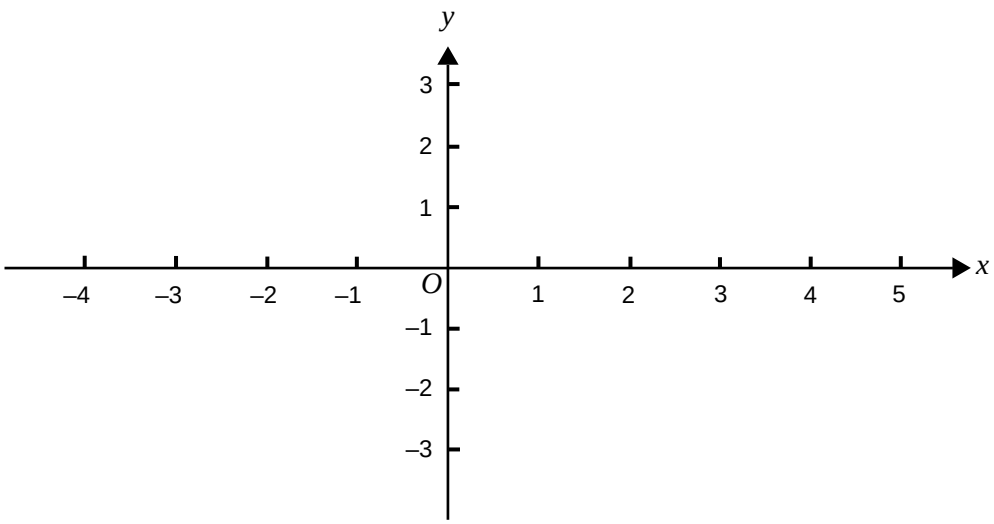
3 marks

Question 7

The graph of the function f, with domain $(-2, 4)$, is shown below.



a. On the set of axes below, sketch the graph of the derivative function f'.



b. State the domain of f'.

_____

2 + 1 = 3 marks

Question 8

a. Find the ***x*-coordinates** of the points of intersection of the line with equation $y = 3x + 1$ and the parabola with equation $y = 2x^2 + 4x - 5$.

b. Use calculus to find the area, correct to three decimal places, of the region bounded by the line with equation $y = 3x + 1$ and the parabola with equation $y = 2x^2 + 4x - 5$.

2 + 3 = 5 marks

END OF QUESTION AND ANSWER BOOK

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

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

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

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	$\frac{{}^DC_x\, {}^{N-D}C_{n-x}}{{}^NC_n}$	$n\frac{D}{N}$	$n\frac{D}{N}\left(1-\frac{D}{N}\right)\left(\frac{N-n}{N-1}\right)$
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