VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education
2005

MATHEMATICAL METHODS

Written examination 1
(Facts, skills and applications)

Friday 4 November 2005

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), one approved graphics calculator (memory DOES NOT need to be cleared) and, if desired, one scientific calculator.
- 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 unauthorised electronic 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.
Choose the response that is **correct** for the question.
A correct answer scores 1, an incorrect answer scores 0.
Marks will **not** be deducted for incorrect answers.
No marks will be given if more than one answer is completed for any question.

The following information refers to Questions 1 and 2.

Over a thirty-day period, Timothy recorded the number of hours each day that he spent cycling on his bicycle. The results are shown in the table below.

Number of hours each day spent cycling (x)	0	1	2	3	4
Proportion of days on which x hours were spent cycling	$\frac{3}{30}$	$\frac{6}{30}$	$\frac{7}{30}$	$\frac{10}{30}$	$\frac{4}{30}$

Question 1

During this thirty-day period, the proportion of days on which Timothy cycled for at least two hours is

A. $\frac{7}{30}$

B. $\frac{14}{30}$

C. $\frac{17}{30}$

D. $\frac{21}{30}$

E. $\frac{27}{30}$

Question 2

During this thirty-day period, the mean number of hours each day that Timothy spent cycling was

A. $\frac{27}{30}$

B. $\frac{66}{30}$

C. $\frac{69}{30}$

D. $\frac{188}{30}$

E. 66

Question 3

The 0.95 quantile for the standard normal probability distribution is approximately equal to

A. -1.960

B. -1.645

C. 0

D. 1.645

E. 1.960

Question 4

At a party there are six unmarked boxes. Two boxes each have prizes, the other four boxes are empty. When two boxes are selected without replacement, the probability of selecting at least one box with a prize is

A. $\frac{1}{15}$

B. $\frac{6}{15}$

C. $\frac{8}{15}$

D. $\frac{5}{9}$

E. $\frac{9}{15}$

Question 5

During a holiday, Mark and John play a total of n games of golf. The probability that John wins any game is 0.3. No games are drawn.

If the probability that John wins no games is 0.0576, correct to four decimal places, the total number of games that they play is

A. 1

B. 2

C. 5

D. 8

E. 12

Question 6

Which one of the following is **not** a factor of $x^4 + 3x^3 - 4x^2 - 12x$?

A. $x - 2$

B. $x + 2$

C. x

D. $x - 3$

E. $x + 3$

Question 7

The function $f: [a, \infty) \rightarrow R$ with rule $f(x) = 2(x - 3)^2 + 1$ will have an inverse function if

A. $a \leq -3$

B. $a \geq -3$

C. $a \geq 1$

D. $a \leq 3$

E. $a \geq 3$

Question 8

The solution of the equation $3e^{2x} = 4$ is closest to

A. –0.406

B. –0.405

C. 0.143

D. 0.144

E. 0.575

Question 9

If $2 \log_{10}(x) + 3 = 5 \log_{10}(x)$ then x is equal to

A. 0

B. $\log_{10}(3)$

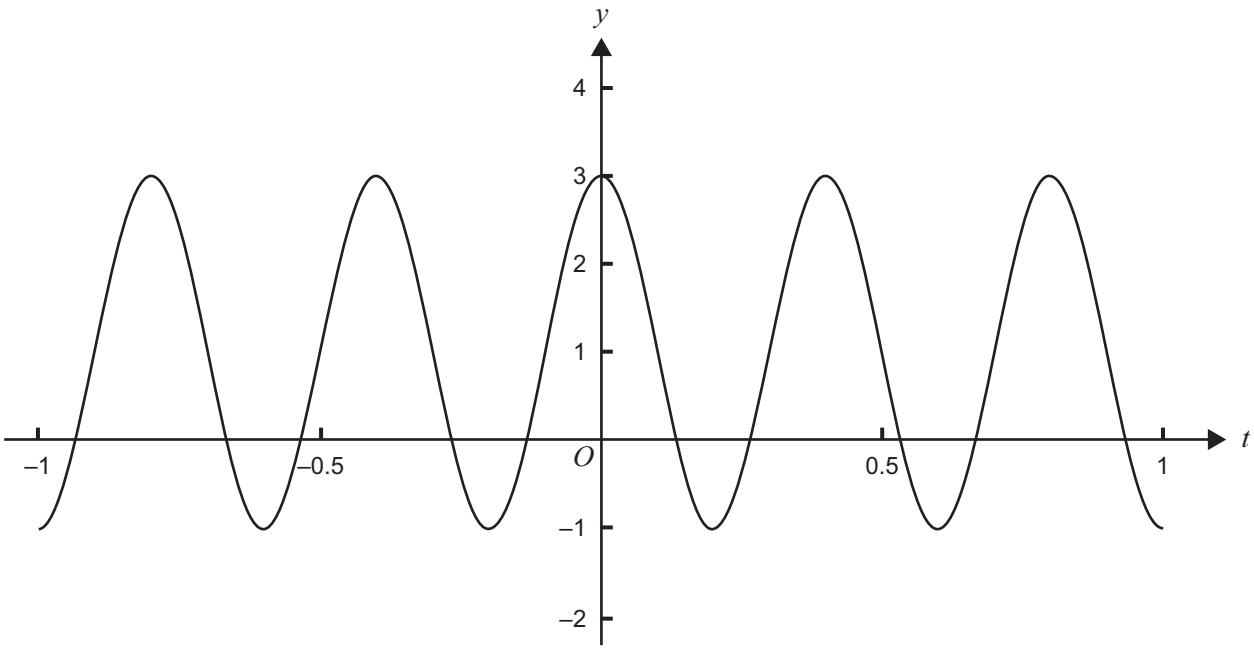
C. 1

D. $\sqrt[3]{3}$

E. 10

Question 10

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



The rule for f could be

A. $f(t) = 2\cos(5\pi t) + 1$

B. $f(t) = 2\sin(5\pi t) + 1$

C. $f(t) = \cos(5\pi t) + 2$

D. $f(t) = \sin(5t) + 2$

E. $f(t) = 2\cos(5t) + 1$

Question 11

The period of the graph of the function with rule $f(x) = \tan\left(\frac{x}{4}\right)$ is

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

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

C. π

D. 4π

E. 8π

Question 12

The **least** value of x for $0 < x < \frac{\pi}{2}$, such that $\cos(2x) = \sqrt{3}\sin(2x)$, is

A. $\frac{\pi}{12}$

B. $\frac{\pi}{6}$

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

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

E. $\frac{7\pi}{12}$

Question 13

Let $f(x) = a\sin(x) + c$, where a and c are real numbers and $a > 0$.

Then $f(x) < 0$ for all real values of x if

A. $c < -a$

B. $c > -a$

C. $c = -a$

D. $-a < c < a$

E. $c < a$

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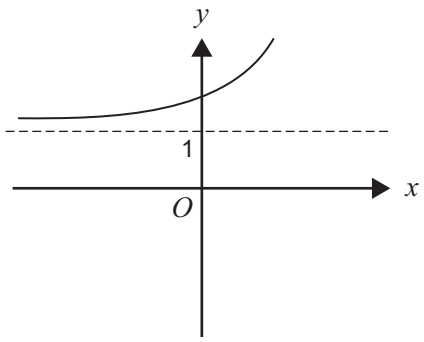
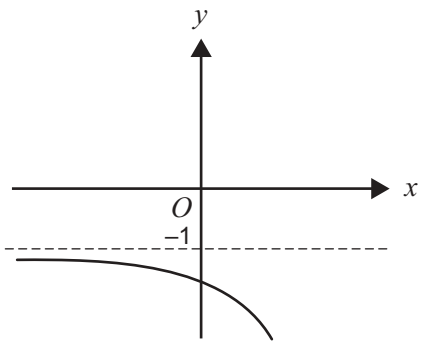
Question 14

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

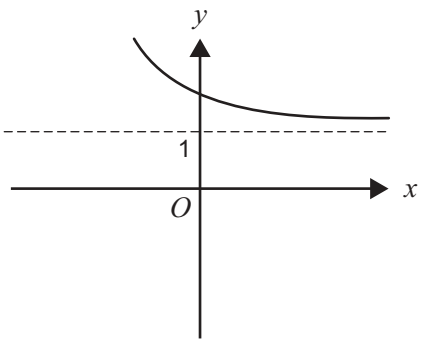


Which one of the following is most likely to be the graph of the inverse function f^{-1}?

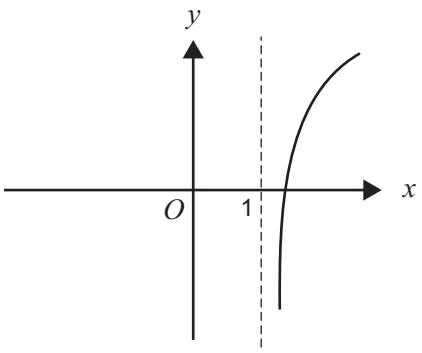
A.



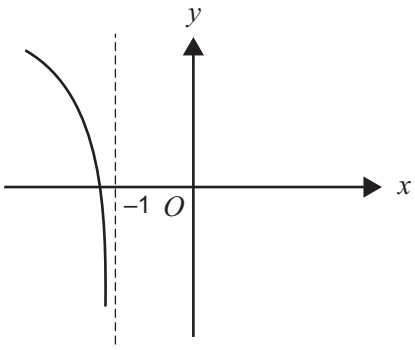
B.



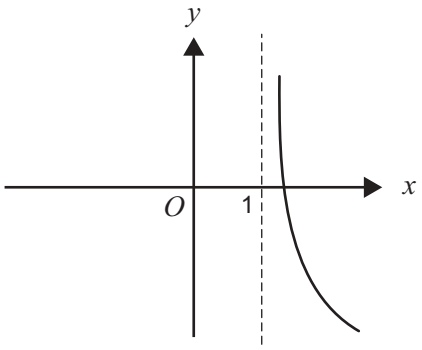
C.



D.



E.



Question 15

The graph of the function with rule $y = x^3$ is transformed as follows

- a translation of –2 units parallel to the x-axis
  and then
- a dilation by a factor of $\frac{1}{2}$ from the y-axis

The rule of the function corresponding to the transformed graph is

A. $y = \frac{1}{2}(x-2)^3$

B. $y = 2(x-2)^3$

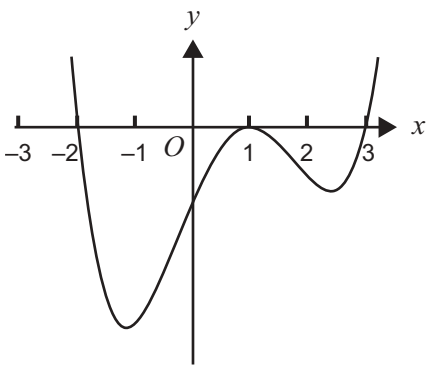
C. $y = \left(\frac{x}{2}+2\right)^3$

D. $y = 2(x+2)^3$

E. $y = (2x+2)^3$

Question 16

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



The rule for f is most likely to be

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

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

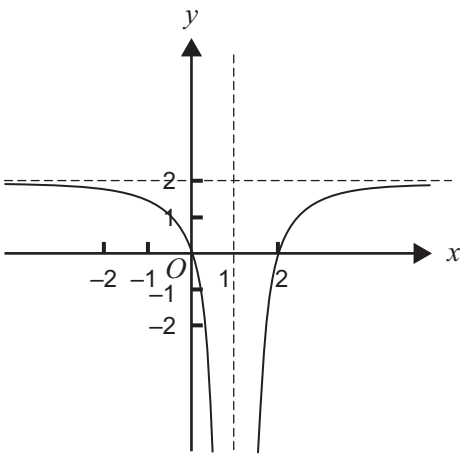
C. $f(x) = (2-x)(x+1)^2(x+3)$

D. $f(x) = (x-2)(x-1)^2(x-3)$

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

Question 17

Part of the graph of the function with rule $y = \dfrac{a}{(x+b)^2} + c$ is shown below.



The values of a, b and c respectively are

	a	b	c
A.	2	–1	0
B.	–2	–1	2
C.	2	1	1
D.	2	–2	1
E.	–2	1	2

Question 18

The graph of $y = \dfrac{x-2}{x+3}$ has two asymptotes with equations

A. $x = 3, \quad y = 1$

B. $x = 3, \quad y = -2$

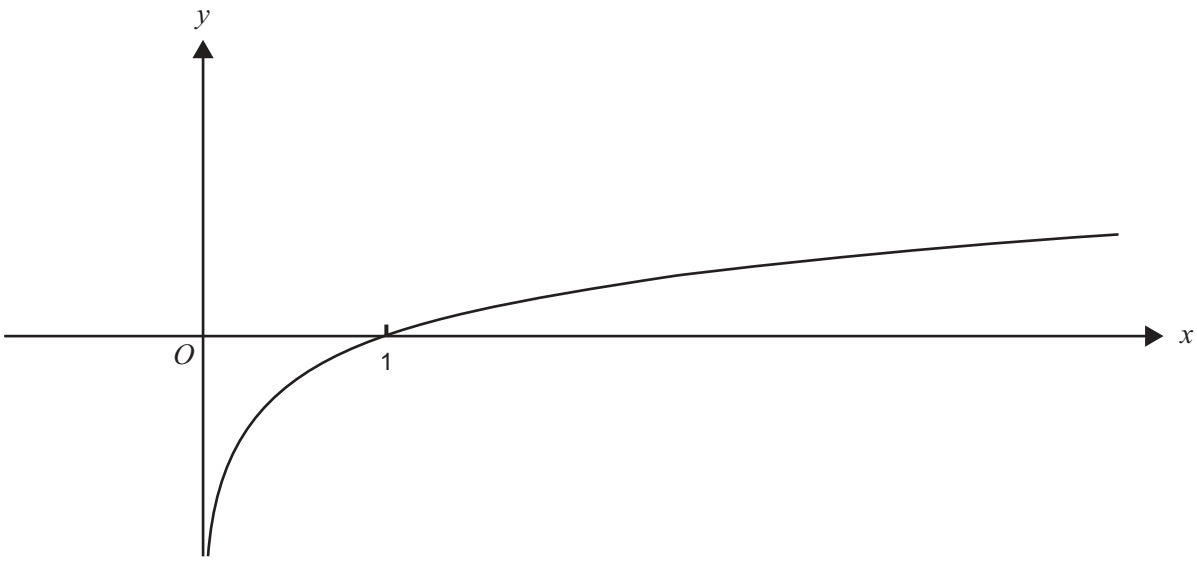
C. $x = -3, \quad y = 1$

D. $x = -3, \quad y = 2$

E. $x = -3, \quad y = -\dfrac{2}{3}$

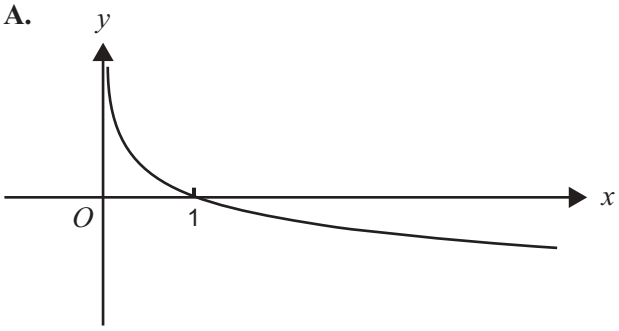
Question 19

The graph of the function $f: (0, \infty) \rightarrow R$, with rule $y = f(x)$, is shown below.

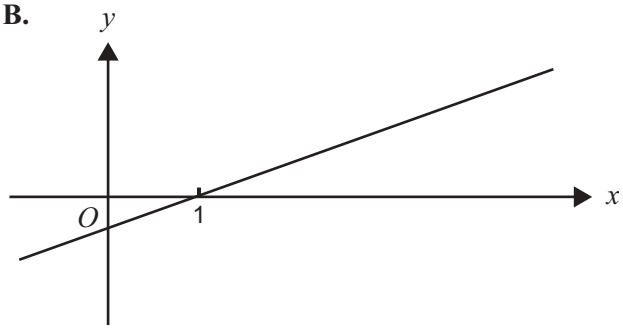


Which one of the following could be the graph of $y = f'(x)$?

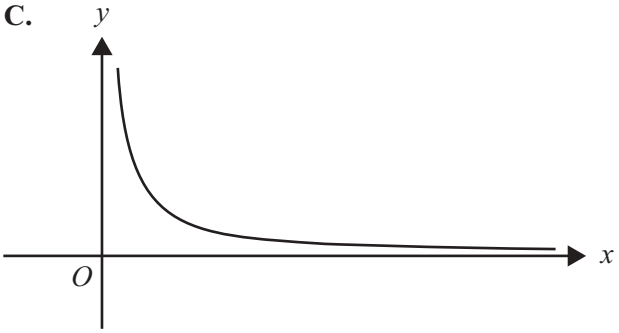
A.



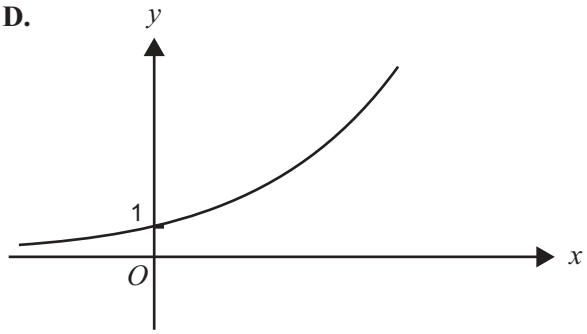
B.



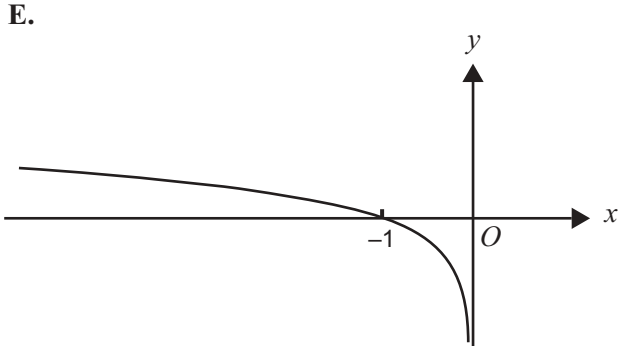
C.



D.



E.



Question 20

The average rate of change of the function with rule $f(x) = x^2 + e^x$ between $x = 0$ and $x = 1$ is

A. 0

B. 1

C. e

D. $1 + e$

E. $2 + e$

Question 21

The derivative of $10p(1 - p)^9$ with respect to p is equal to

A. $90(1 - p)^8$

B. $90p(1 - p)^8$

C. $-90p(1 - p)^8$

D. $10(1 - p)^8 (1 - 10p)$

E. $10(1 - p)^8 (1 + 8p)$

Question 22

Let $f : R \to R$ be a differentiable function. For all real values of x, the derivative of $f(e^{2x})$ with respect to x will be equal to

A. $2e^{2x} f'(x)$

B. $e^{2x} f'(x)$

C. $2e^{2x} f'(e^{2x})$

D. $2f'(e^{2x})$

E. $f'(e^{2x})$

Question 23

The equation of the tangent to the graph of $y = 2x^4 - 4x^3$ at the point where $x = 2$ is

A. $y = \frac{-1}{16}$

B. $y = \frac{-1}{16}(x - 2)$

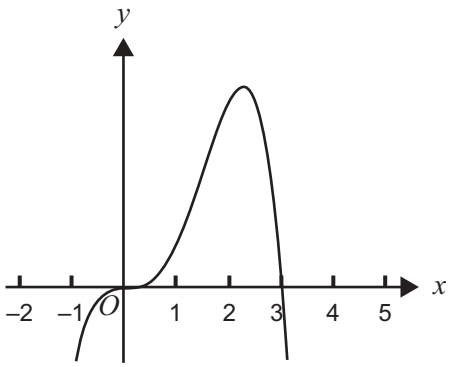
C. $y = 16$

D. $y = 16(x - 2)$

E. $y = (8x^3 - 12x^2)(x - 2)$

Question 24

Below is a sketch of the graph of a continuous and differentiable function $f: R \to R$.



A possible property of f', the derivative of f, is

A. $f'(x) < 0$ for $x \in (-\infty, 0) \cup (0, 2)$

B. $f'(x) > 0$ for $x \in (-\infty, 0) \cup (0, 2)$

C. $f'(x) > 0$ for $x \in (2, \infty)$

D. $f'(x) < 0$ for $x \in (-\infty, 0) \cup (3, \infty)$

E. $f'(x) > 0$ for $x \in (0, 3)$

Question 25

For the function $f: [0, 2\pi] \to R$, where $f(x) = \sin(2x) + \cos(x)$, the number of solutions of the equation $f'(x) = -0.8$ is

A. 0

B. 1

C. 2

D. 3

E. 4

Question 26

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

A. $\frac{-6}{(2x-1)^{\frac{1}{2}}} + c$

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

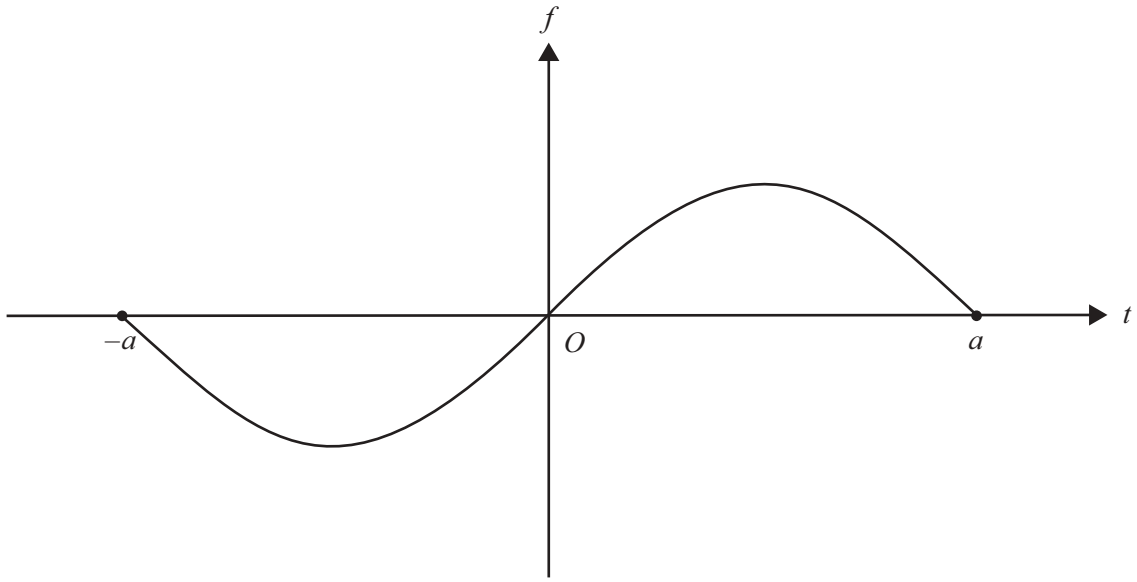
C. $\frac{-1}{(2x-1)^{\frac{1}{2}}} + c$

D. $\frac{-9}{(2x-1)^{\frac{5}{2}}} + c$

E. $\frac{-3}{4(2x-1)^{\frac{5}{2}}} + c$

Question 27

The graph of the function $f:[-a, a] \to R$ where a is a positive real constant is shown below.



The function G: $[-a, a] \to R$ is defined by $G(x) = \int_0^x f(t)dt$.

Then $G(x) > 0$

A. for $x \in [-a, 0) \cup (0, a]$

B. for $x \in (0, a]$ only

C. for $x \in [0, a]$ only

D. for $x \in [-a, a]$

E. nowhere in $[-a, a]$

END OF PART I MULTIPLE-CHOICE QUESTION BOOK

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education 2005

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER

Figures										Letter
Words										

MATHEMATICAL METHODS

Written examination 1

(Facts, skills and applications)

Friday 4 November 2005

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 II
QUESTION AND ANSWER BOOK

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.

Structure of book

Number of questions	*Number of questions to be answered*	*Number of marks*
7	7	23

- 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), one approved graphics calculator (memory DOES NOT need to be cleared) and, if desired, one scientific calculator.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.

Materials supplied
- Question and answer book of 7 pages.

Instructions
- Detach the formula sheet from the centre of the Part I book during reading time.
- Write your **student number** in the space provided above on this page.
- All written responses must be in English.

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

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

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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.

In questions where more than 1 mark is available, appropriate working must be shown.

Where an instruction to **use calculus** is stated for a question, you must show an appropriate derivative or antiderivative.

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

Question 1

The distribution of scores in a particular examination follows a normal distribution with a mean of 41 and a standard deviation of 3. Juliet's score is 46.

What proportion of candidates have a score less than Juliet's? State your answer correct to three decimal places.

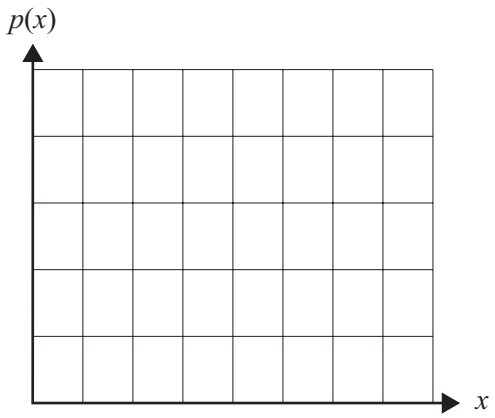
2 marks

Question 2

The random variable X has the following probability distribution.

x	0	1	2	3	4
$\Pr(X = x)$	0.15	0.4	0.3	0.1	0.05

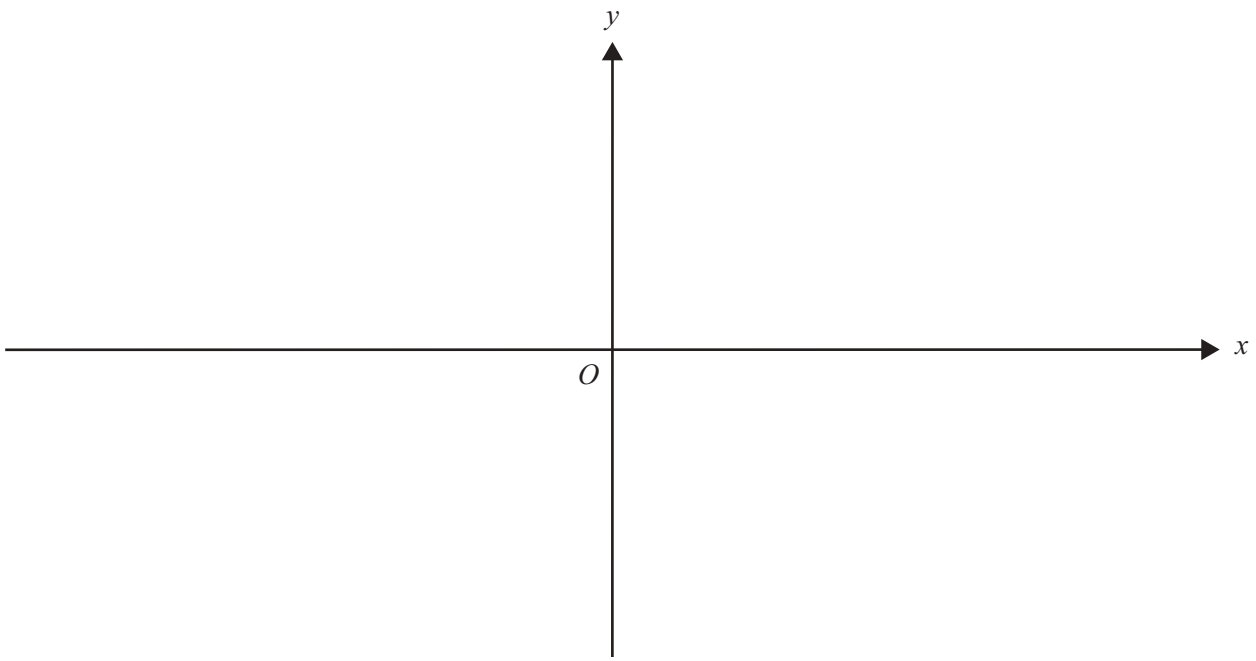
Draw a graph of the probability distribution using the axes provided.



1 mark

Question 3

On the axes provided, sketch the graph of the function $f: (-\pi, \pi) \to R, f(x) = \tan\left(\frac{x}{2}\right) + 1$.
Clearly label any axes intercepts, and any asymptotes with their equations.



3 marks

Question 4

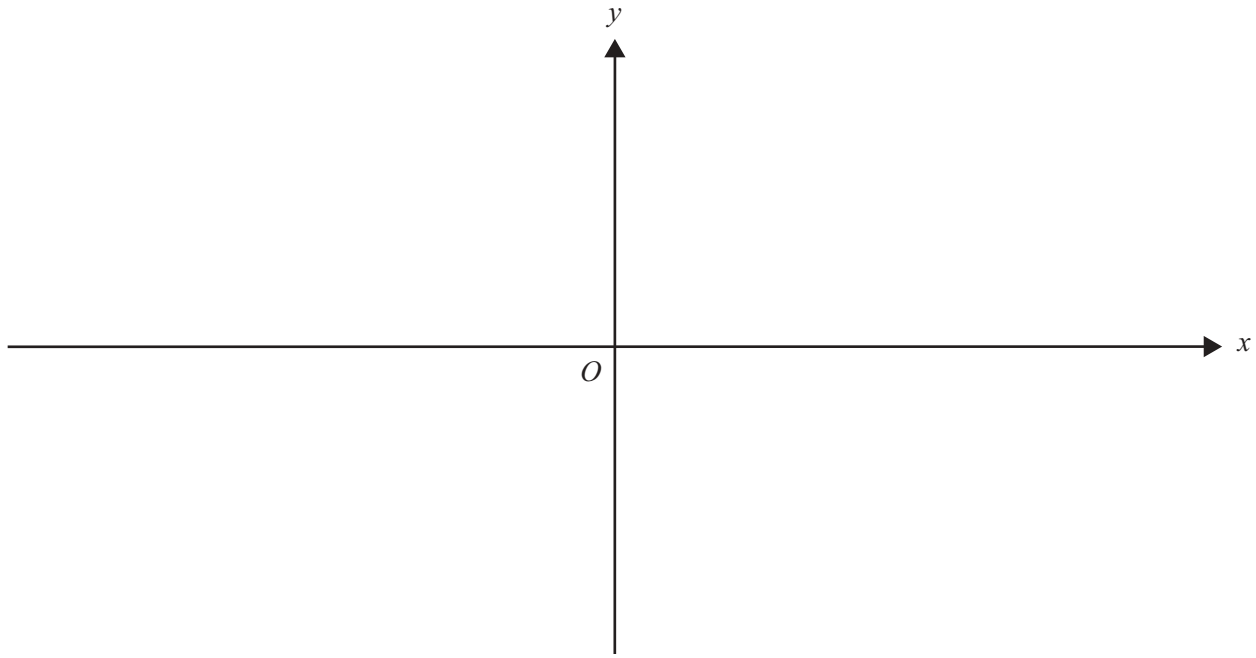
The graph of the function $f: R\backslash\{-1\} \to R$ has a vertical asymptote with equation $x = -1$ and a horizontal asymptote with equation $y = 2$. It also has the following properties.

$f(0) = 0$

$f'(x) > 0$ for all $x < -1$

$f'(x) > 0$ for all $x > -1$

On the axes provided, sketch a possible graph of $y = f(x)$.

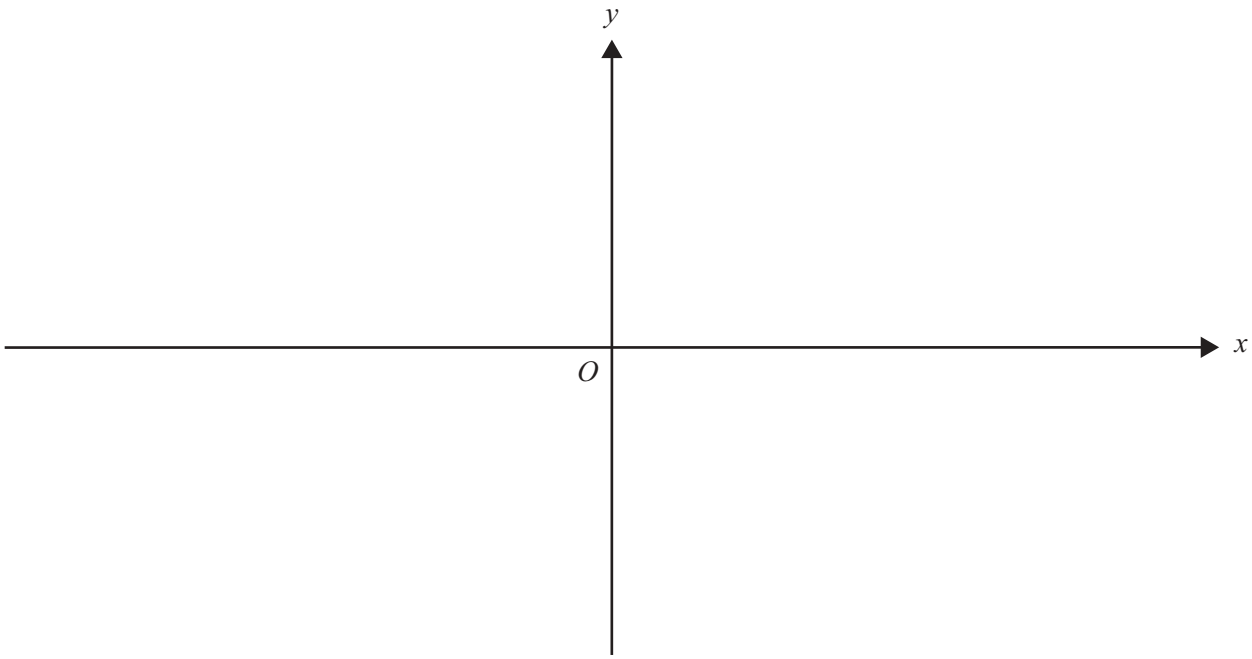


3 marks

Question 5

A function f is defined by the rule $f(x) = 8 - 3e^{-x}$ for $x \geq 0$.

a. Sketch the graph of f on the axes below, clearly labelling any axes intersects **with their coordinates**, and any asymptotes with their equations.

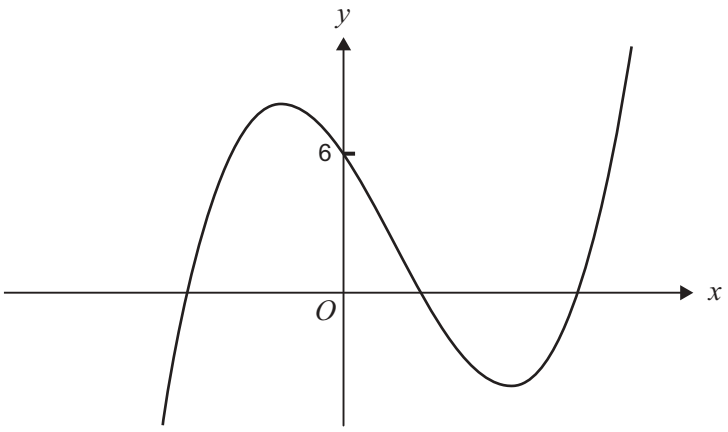


b. Find the rule of the inverse function f^{-1}.

2 + 2 = 4 marks

Question 6

Part of the graph of the curve with equation $y = x^3 - 2x^2 - 5x + 6$ is shown below.



a. Write the equation in the form $y = (x + 2)(x^2 + bx + c)$.

b. **Hence**, by factorising, find the **exact** values of the x-intercepts.

c. Use calculus to find the total area enclosed by the graph of the function with rule $y = x^3 - 2x^2 - 5x + 6$ and the x-axis. Give your answer correct to two decimal places.

1 + 2 + 4 = 7 marks

PART II – continued

Question 7

a. Find the **exact** value of k for which $3^x = e^{kx}$ for all $x \in R$.

b. **Hence** use calculus to find the derivative of $y = 3^x$ with respect to x.

1 + 2 = 3 marks

END OF PART II 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

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

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

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

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

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

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

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	$p(x)$	$\mu = \sum x\,p(x)$	$\sigma^2 = \sum (x-\mu)^2 p(x)$ $= \sum x^2 p(x) - \mu^2$
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