BOARD OF STUDIES
NEW SOUTH WALES

2012 HSC Mathematics
Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	B
2	D
3	C
4	A
5	C
6	D
7	C
8	A
9	B
10	B

Section II

Question 11 (a)

Criteria	Marks
• Correct answer	2
• Incorrect answer of the form $(2x \pm 1)(x \pm 3)$ or $(2x \pm 3)(x \pm 1)$	1

Question 11 (b)

Criteria	Marks
• Correct solution	2
• Obtains $x < 1$ or $x > -\frac{1}{3}$	1

Question 11 (c)

Criteria	Marks
• Correct solution	2
• Correct slope, or equivalent merit	1

Question 11 (d)

Criteria	Marks
• Correct answer	2
• Obtains $5\left(3+e^{2x}\right)^4$ or a product involving $\left(3+e^{2x}\right)$ and e^{2x}, or equivalent merit	1

Question 11 (e)

Criteria	Marks
• Correct answer	2
• Finds focal length or equivalent	1

Question 11 (f)

Criteria	Marks
• Correct solution	2
• Makes some progress	1

Question 11 (g)

Criteria	Marks
• Correct solution	3
• Correctly evaluates $\left(a\tan\frac{x}{2}\right)_0^{\frac{\pi}{2}}$, or equivalent merit	2
• Primitive of the form $a\tan\frac{x}{2}$, or equivalent merit	1

Question 12 (a) (i)

Criteria	Marks
• Correct answer	2
• Attempts to use the product rule	1

Question 12 (a) (ii)

Criteria	Marks
• Correct answer	2
• Attempts to use the quotient rule, or equivalent merit	1

Question 12 (b)

Criteria	Marks
• Correct primitive	2
• Obtains primitive involving $\log_e\left(x^2+6\right)$	1

Question 12 (c) (i)

Criteria	Marks
• Correct answer	2
• Makes some progress	1

Question 12 (c) (ii)

Criteria	Marks
• Correct answer	1

Question 12 (c) (iii)

Criteria	Marks
• Correct solution	2
• Makes substantial progress	1

Question 12 (d) (i)

Criteria	Marks
• Correct solution	3
• Makes significant progress in the use of Simpson's rule	2
• Attempts to use Simpson's rule	1

Question 12 (d) (ii)

Criteria	Marks
• Correct answer	1

Question 13 (a) (i)

Criteria	Marks
• Correct solution	2
• Finds A and B, or equivalent merit	1

Question 13 (a) (ii)

Criteria	Marks
• Correct solution	2
• Attempts to use the cosine rule, or equivalent merit	1

Question 13 (a) (iii)

Criteria	Marks
• Correct solution	3
• Makes substantial progress towards finding N	2
• Attempts to find an equation for the line CN, or equivalent progress	1

Question 13 (b) (i)

Criteria	Marks
• Correct solution	1

Question 13 (b) (ii)

Criteria	Marks
• Correct solution	3
• Correct primitive, or equivalent merit	2
• Writes a definite integral of the difference of the two functions, or equivalent merit	1

Question 13 (c) (i)

Criteria	Marks
• Correct answer	1

Question 13 (c) (ii)

Criteria	Marks
• Correct answer	1

Question 13 (c) (iii)

Criteria	Marks
• Correct solution	2
• Finds the probability that both marbles are white, or equivalent merit	1

Question 14 (a) (i)

Criteria	Marks
• Correct solution	3
• Correctly solves $f'(x) = 0$ and attempts to find the nature of the stationary points, or equivalent merit	2
• Attempts to solve $f'(x) = 0$, or equivalent merit	1

Question 14 (a) (ii)

Criteria	Marks
• Correct graph	2
• Correct general shape showing their stationary points, or equivalent merit	1

Question 14 (a) (iii)

Criteria	Marks
• Correct solution	1

Question 14 (a) (iv)

Criteria	Marks
• Correct solution	1

Question 14 (b)

Criteria	Marks
• Correct solution	3
• Correct primitive, or equivalent merit	2
• Significant progress to definite integral for the volume, or equivalent merit	1

Question 14 (c) (i)

Criteria	Marks
• Correct explanation	1

Question 14 (c) (ii)

Criteria	Marks
• Correct solution	1

Question 14 (c) (iii)

Criteria	Marks
• Correct solution	1

Question 14 (c) (iv)

Criteria	Marks
• Correct solution	2
• Attempts to solve a relevant exponential equation	1

Question 15 (a) (i)

Criteria	Marks
• Correct solution	2
• Attempts to sum a relevant geometric series	1

Question 15 (a) (ii)

Criteria	Marks
• Correct solution	1

Question 15 (b) (i)

Criteria	Marks
• Correct answer	1

Question 15 (b) (ii)

Criteria	Marks
• Correct answer	1

Question 15 (b) (iii)

Criteria	Marks
• Correct solution	2
• Correct primitive, or equivalent merit	1

Question 15 (b) (iv)

Criteria	Marks
• Correct solution	2
• Attempt to solve $\dot{x} = 0$, or equivalent merit	1

Question 15 (c) (i)

Criteria	Marks
• Correct expression	1

Question 15 (c) (ii)

Criteria	Marks
• Correct solution	2
• A correct expression for A_{300} involving M, or equivalent merit	1

Question 15 (c) (iii)

Criteria	Marks
• Correct solution	3
• Makes substantial progress in solving $A_n = 180\,000$	2
• Attempts to solve the equation $A_n = 180\,000$, or equivalent merit	1

Question 16 (a) (i)

Criteria	Marks
• Correct solution	2
• States one relevant geometric fact with reason, or equivalent merit	1

Question 16 (a) (ii)

Criteria	Marks
• Correct solution	2
• Obtains $\frac{b-x}{x}=\frac{x}{a-x}$, or equivalent merit	1

Question 16 (b) (i)

Criteria	Marks
• Correct solution	2
• Finds the slope of PT or the coordinates of T, or equivalent merit	1

Question 16 (b) (ii)

Criteria	Marks
• Correct solution	1

Question 16 (b) (iii)

Criteria	Marks
• Correct solution	2
• Finds OP, or equivalent merit	1

Question 16 (b) (iv)

Criteria	Marks
• Correct solution	3
• Correctly solves $\frac{dA}{d\theta} = 0$, or equivalent merit	2
• Correctly finds $\frac{dA}{d\theta}$, or equivalent merit	1

Question 16 (c) (i)

Criteria	Marks
• Correct solution	2
• Eliminates x or y from $y = x^2$ and $x^2 + \left(y - c\right)^2 = r^2$, or equivalent merit	1

Question 16 (c) (ii)

Criteria	Marks
• Correct solution	1

Mathematics

2012 HSC Examination Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	1.1	P3
2	1	1.1	P3
3	1	9.2	P4
4	1	10.1, 10.4	H7
5	1	6.5	P4
6	1	5.2, 5.3, 13.1	P4, H5
7	1	12.1, 12.2	H3
8	1	4.4	P4
9	1	12.5	H3, H5
10	1	11.1, 11.2	H5

Section II

Question	Marks	Content	Syllabus outcomes
11 (a)	2	1.3	P3
11 (b)	2	1.4	P3
11 (c)	2	10.7	P6, P7
11 (d)	2	8.9, 12.5	P7, H3
11 (e)	2	9.5	H5, H9
11 (f)	2	13.1	H5
11 (g)	3	11.2, 13.6	H5
12 (a) (i)	2	8.8, 12.5	P7, H3
12 (a) (ii)	2	8.8, 13.5	P7, H5
12 (b)	2	12.5	H5
12 (c) (i)	2	7.5	H5
12 (c) (ii)	1	7.5	H5
12 (c) (iii)	2	7.5	H5
12 (d) (i)	3	11.3	H8
12 (d) (ii)	1	14.1	H4
13 (a) (i)	2	6.5	P4
13 (a) (ii)	2	5.5	P4
13 (a) (iii)	3	6.2, 6.3	H5
13 (b) (i)	1	1.4	P4

Question	Marks	Content	Syllabus outcomes
13 (b) (ii)	3	11.4	H8
13 (c) (i)	1	3.2, 3.3	H5
13 (c) (ii)	1	3.2, 3.3	H5
13 (c) (iii)	2	3.2, 3.3	H5
14 (a) (i)	3	10.2	H6
14 (a) (ii)	2	10.5	H6
14 (a) (iii)	1	10.1	H6
14 (a) (iv)	1	10.5, 10.6	H2
14 (b)	3	11.2, 11.4	H8
14 (c) (i)	1	12.2, 14.2	H3, H4
14 (c) (ii)	1	14.2	H3, H4
14 (c) (iii)	1	14.2	H3, H4
14 (c) (iv)	2	14.2	H3, H4
15 (a) (i)	2	7.2, 7.5	H5
15 (a) (ii)	1	7.3, 7.5	H5
15 (b) (i)	1	14.3	H4, H5
15 (b) (ii)	1	14.3	H4, H5
15 (b) (iii)	2	13.6, 14.3	H4, H5
15 (b) (iv)	2	14.3	H4, H5
15 (c) (i)	1	7.5	H5
15 (c) (ii)	2	7.5	H5
15 (c) (iii)	3	7.5, 12.2	H3, H5
16 (a) (i)	2	2.3	H2, H5
16 (a) (ii)	2	2.3	H2, H5
16 (b) (i)	2	5.1, 6.2	P4, H2, H5
16 (b) (ii)	1	5.1, 6.3	H2, H5
16 (b) (iii)	2	2.3, 6.3, 6.8	P4, H2, H5
16 (b) (iv)	3	10.6,13.5	H2, H5
16 (c) (i)	2	6.8, 9.2, 9.3	P4, H2, H4, H5
16 (c) (ii)	1	6.8, 9.3	P4, H2, H4, H5