

**General Mathematics CSSA Trial HSC Examination
2005 Examination Mapping Grid**

Section I

Question	Marks	Content	Syllabus Outcomes	Targeted Performance Bands
1	1	DA3: Displaying Single Data Sets	P4	2-3
2	1	PB1: The Language of Chance	P9 P11	2-3
3	1	AM2: Modelling and Linear Relationships	P3 P5	2-3
4	1	DA7: Correlation	H4	2-3
5	1	M6: Applications of Trigonometry	H1 H3	2-3
6	1	AM3: Algebraic Skills and Techniques	H2 H7	2-3
7	1	DA2: Data Collection and Sampling	P9	2-3
8	1	AM4: Modelling Linear and Non-Linear Relationships	H1 H2 H3 H5	3-4
9	1	PB4: Applications of Probability	H7 H11	3-4
10	1	FM4: Credit and Borrowing	H1 H2 H5	3-4
11	1	M4: Right-angled Triangles	P2 P6	3-4
12	1	M3: Similarity of Two-Dimensional Figures	P2 P6 P7	3-4
13	1	DA6: The Normal Distribution	H9	3-4
14	1	FM4: Credit and Borrowing	H2 H5 H8	3-4
15	1	M5: Further Applications of Area and Volume	H1 H2 H6 H7	3-4
16	1	FM2: Investing Money	P2 P8	4-5
17	1	PB3: Multi-Stage Events	H7 H11	3-4
18	1	DA5: Interpreting Sets of Data	H4	3-4
19	1	FM4: Credit and Borrowing	H1 H2 H8	4-5
20	1	M5: Further Applications of Area and Volume	H1 H2 H7	4-5
21	1	AM4: Modelling Linear and Non-Linear Relationships	H1 H2 H3	4-5
22	1	FM5: Further Applications of Area and Volume	H2 H5 H8	4-5

Section II

Question	Marks	Content	Syllabus Outcomes	Targeted Performance Bands
23 (a) (i)	1	DA5: Interpreting Sets of Data	H2	2-3
23 (a) (ii)	1	DA5: Interpreting Sets of Data	H4	3-4
23 (a) (iii)	1	DA5: Interpreting Sets of Data	H5	4-5
23 (b) (i)	2	M5: Further Applications of Area and Volume	H2 H3 H6 H7	3-4
23 (b) (ii)	1	M2: Applications of Area and Volume	P2 P6	2-3
23 (c) (i)	1	PB2: Relative Frequency and Probability	P2 P10	2-3
23 (c) (ii)	1	PB2: Relative Frequency and Probability	P2 P10	2-3

Question	Marks	Content	Syllabus Outcomes	Targeted Performance Bands
23 (d) (i)	1	DA4: Summary Statistics	P2	2-3
23 (d) (ii)	1	DA4: Summary Statistics	P2	2-3
23 (e) (i)	1	M2: Applications of Area and Volume	P2 P6	3-4
23 (e) (ii)	2	M6: Applications of Trigonometry	H1 H2 H6 H7	3-4
24 (a)	2	PB3: Multi-Stage Events	H2 H3 H10	2-3
24 (b) (i)	2	AM3: Algebraic Skills and Techniques	H2 H7	3-4
24 (b) (ii)	2	AM3: Algebraic Skills and Techniques	H2 H7	3-4
24 (c) (i)	1	FM4: Credit and Borrowing	H2 H5 H8	2-3
24 (c) (ii)	1	FM4: Credit and Borrowing	H2 H5 H8	2-3
24 (c) (iii)	1	FM4: Credit and Borrowing	H2 H5 H8	3-4
24 (c) (iv)	2	FM4: Credit and Borrowing	H2 H5 H8	3-4
24 (c) (v)	2	FM4: Credit and Borrowing	H2 H5 H8	4-5
25 (a) (i)	1	DA7: Correlation	H1 H2 H4	2-3
25 (a) (ii)	1	DA7: Correlation	H1 H5 H11	4-5
25 (b) (i)	1	FM3: Taxation	P2 P8	3-4
25 (b) (ii)	2	FM3: Taxation	P2 P8	3-4
25 (b) (iii)	1	FM3: Taxation AM2: Modelling and Linear Relationships	P2 P5 P8 P11	4-5
25 (c) (i)	2	M4: Right-angled Triangles	P2 P3 P6 P7	2-3
25 (c) (ii)	1	M4: Right-angled Triangles	P2 P3 P6 P7	2-3
25 (c) (iii)	2	M6: Applications of Trigonometry	H2 H6 H7	3-4
25 (d)	2	M1: Units of Measurement	P2 P7	3-4
26 (a) (i)	2	PB3: Multi-Stage Events	H2 H3 H4 H10	2-3
26 (a) (ii)	1	PB3: Multi-Stage Events	H2 H3 H4 H10	2-3
26 (a) (iii)	2	PB3: Multi-Stage Events	H2 H3 H4 H10	4-5
26 (a) (iv)	1	PB3: Multi-Stage Events	H2 H3 H4 H10	4-5
26 (b)	2	DA3: Displaying Single Data Sets	P11	3-4
26 (c) (i)	1	FM6: Applications of Trigonometry	H2 H5 H8	3-4
26 (c) (ii)	2	FM6: Applications of Trigonometry	H2 H5 H8	3-4
26 (c) (iii)	2	FM6: Applications of Trigonometry	H2 H5 H8 H11	4-5
27 (a)	2	AM1	P2	4-5
27 (b) (i)	2	DA6: The Normal Distribution	H9	4-5
27 (b) (ii)	1	DA6: The Normal Distribution	H9	4-5
27 (c) (i)	1	DA5: Interpreting Sets of Data	H1 H4 H9	2-3
27 (c) (ii)	1	DA5: Interpreting Sets of Data	H1 H4 H9	3-4
27 (c) (iii)	3	DA5: Interpreting Sets of Data	H1 H4 H5 H9 H11	5-6
27 (d)	3	FM5: Further Applications of Area and Volume	H2 H5 H8	5-6
28 (a) (i)	2	M7: Spherical Geometry	H1 H2 H7	4-5
28 (a) (ii)	2	M7: Spherical Geometry	H1 H2 H7	4-5
28 (a) (iii)	2	M1: Units of Measurement	P2	4-5
28 (b) (i)	2	AM4: Modelling Linear and Non-Linear Relationships	H1 H2 H3 H5 H11	5-6
28 (b) (ii)	2	AM4: Modelling Linear and Non-Linear Relationships	H1 H2 H3 H5 H11	4-5
28 (b) (iii)	2	AM4: Modelling Linear and Non-Linear Relationships	H1 H2 H3 H5 H11	4-5
28 (b) (iv)	1	AM4: Modelling Linear and Non-Linear Relationships	H1 H2 H3 H5 H11	4-5

**General Mathematics CSSA Trial HSC Examination
2005 Examination Marking Guidelines**

Section I

Q1	D	Q6	A	Q11	A	Q16	C	Q21	C
Q2	B	Q7	C	Q12	B	Q17	D	Q22	B
Q3	B	Q8	A	Q13	B	Q18	C		
Q4	D	Q9	B	Q14	B	Q19	C		
Q5	C	Q10	D	Q15	A	Q20	C		

Section II

Question	Solution	Criteria	Marks
23 (a) (i)	15	1 mark Correct answer	1
23 (a) (ii)	2000	1 mark Correct answer	1
23 (a) (iii)	Town 2 appears to be the safest as it has less cars stolen over the 5 year period. The area of the graph for town 2 appears to be smaller than the area for town 1.	1 mark Correct reason	1
23 (b) (i)	$A = \frac{h}{3}[d_f + 4d_m + d_l]$ $= \frac{5}{3}[0.8 + 4 \times 1.4 + 1.7]$ $= 13.4 \text{ m}^2$	2 marks Correct working and answer 1 mark Correct substitution in formula	2
23 (b) (ii)	Volume = Ah $= 13.5 \times 6.5$ $= 87.75$ $\approx 88 \text{ m}^3$	1 mark Correct answer	1
23 (c) (i)	$P(I) = \frac{2}{5}$	1 mark Correct answer	1
23 (c) (ii)	P has least chance of being selected as it only occurs once.	1 mark Correct answer	1
23 (d) (i)	Mean = 2.75	1 mark Correct answer	1
23 (d) (ii)	Standard Deviation ≈ 1.1	1 mark Correct answer	1
23 (e) (i)	$\angle DOA = (360 - 296) + 20 = 84^\circ$	1 mark Correct answer	1
23 (e) (ii)	Area = $\frac{1}{2}ab \sin C$ $= \frac{1}{2} \times 81 \times 75 \times \sin 84^\circ$ $= 3021 \text{ m}^2$	2 marks Correct answer 1 mark Correct substitution into formula	2

Question	Solution	Criteria	Marks
24 (a)	Number of ways $= 4 \times 3 \times 2 \times 1$ $= 24$	2 marks Correct answer and explanation/justification 1 mark Correct answer	2
24 (b) (i)	$A = 4\pi r^2$ $r^2 = \frac{A}{4\pi}$ $r = \pm \sqrt{\frac{A}{4\pi}}$	2 marks Correct rearrangement 1 mark Significant progress towards correct rearrangement	2
24 (b) (ii)	$r = \sqrt{\frac{A}{4\pi}}$ $= \sqrt{\frac{1800}{4\pi}}$ $= 11.968268141$ ≈ 12.0	2 marks Correct answer with 3 significant figures 1 mark Correct answer without rounding or correct substitution into formula	2
24 (c) (i)	\$227963.68	1 mark Correct answer	1
24 (c) (ii)	Amount paid off $= 230000 - 227963.68$ $= \$2036.32$	1 mark Correct answer	1
24 (c) (iii)	Total amount paid $= 2240.80 \times 5$ $= \$11204$	1 mark Correct answer	1
24 (c) (iv)	Interest charged $= Prn$ $= 227963.68 \times \frac{0.096}{12} \times 1$ $= \$1823.71$	2 marks Correct answer 1 mark Using correct principal or for using correct rate, but not both	2
24 (c) (v)	Total amount repaid $= 2240.80 \times 18 \times 12$ $= \$484012.80$ Interest paid $= 484012.80 - 230000$ $= \$254012.80$	2 marks Correct answer 1 mark Correct total amount with subsequent error or correct interest calculation with previous error	2
25 (a) (i)	5 hours	1 mark Correct answer	1
25 (a) (ii)	Just because a person does less homework does not imply they watch television, they may do many other things as well.	1 mark Sensible statement explaining no causality	1
25 (b) (i)	Taxable Income $= 59594 - 1630 - 430$ $= \$57534$	1 mark Correct evaluation	1
25 (b) (ii)	Tax Payable $= 3762 + 0.38(57534 - 46000)$ $= \$8144.92$	2 marks Correct answer 1 mark Selection of correct row of table and incorrect evaluation or selection of incorrect row of table but correct evaluation	2
25 (b) (iii)	The different gradients represent the different tax rates in the income tax system.	1 mark Mentioning different tax rates	1

Question	Solution	Criteria	Marks
25 (c) (i)	Final leg $= \sqrt{3.5^2 + 6.3^2}$ $= 7.2069$ Total distance $= 7.2069 + 6.3 + 3.5$ $= 17.0069$ ≈ 17 km	2 marks Using Pythagoras' Theorem correctly and adding other sides 1 mark Attempt using Pythagoras' Theorem	2
25 (c) (ii)	$\tan X = \frac{3.5}{6.3}$ $X \approx 29^\circ$	1 mark Correct tan ratio	1
25 (c) (iii)	Bearing from Start to Buoy 2 $= 100 - 29$ $= 71^\circ$ Bearing from Buoy 2 to Finish $= 71 + 180$ $= 251^\circ$	2 marks Correct answer 1 mark Significant progress towards answer	2
25 (d)	Percentage Error $= \frac{20}{28000} \times \frac{100}{1}$ $= 0.07\%$	2 marks Correct answer 1 mark Working towards correct answer	2
26 (a) (i)	Correct tree diagram	2 marks Correct diagram including probabilities on each branch 1 mark Any correct probabilities on a branch	2
26 (a) (ii)	$P(DD) = 0.2 \times 0.2 = 0.04$	1 mark Correct answer	1
26 (a) (iii)	$P(\text{at least 1 win})$ $= 0.09 + 0.06 + 0.06 + 0.15 + 0.15$ $= 0.51$	2 marks Correct answer 1 mark Significant progress towards answer	2
26 (a) (iv)	$P(\text{no wins}) = 1 - 0.51 = 0.49$	1 mark Correct answer	1
26 (b)	If data is divided into categories then it is then a stratified sample rather than a random sample	2 marks Correct answer 1 mark Some statement regarding the sample type not being named correctly	2
26 (c) (i)	$S = V_0(1 - r)^n$ $= 2200(1 - 0.40)^1$ $= 2200 \times 0.60$ $= \$1320$	1 mark Correct answer	1
26 (c) (ii)	$S = V_0 - Dn$ $0 = 2200 - 5D$ $5D = 2200$ $D = \$4400$	2 marks Correct answer 1 mark Correct substitution into formula	2
26 (c) (iii)	For declining balance method: Depreciation in 1st year $= 2200 - 1320$ $= \$880$ For straight line method: Depreciation in 1st year $= \$440$ Declining balance method is best to use as it allows a higher tax deduction.	2 marks Correct answer with explanation 1 mark Correct answer with no explanation or logical explanation leading to incorrect answer	2

Question	Solution	Criteria	Marks
27 (a)	$\frac{3x+2}{2} = \frac{x-1}{3} - 1$ $\frac{3x+2}{2} = \frac{x-1}{3} - \frac{3}{3}$ $\frac{3x+2}{2} = \frac{x-1-3}{3}$ $\frac{3x+2}{2} = \frac{x-4}{3}$ $3(3x+2) = 2(x-4)$ $9x+6 = 2x-8$ $9x = 2x-14$ $7x = -14$ $x = -2$	2 marks Correct solution 1 mark Significant progress towards correct answer	2
27 (b) (i)	z-score for Test 1: $z = \frac{x - \bar{x}}{\sigma} = \frac{75 - 60}{7.5} = 2$ z-score for Test 2: $z = \frac{x - \bar{x}}{\sigma} = \frac{80 - 65}{15} = 1$ Test 1 was the better mark as it has the higher z-score.	2 marks Correct z-scores and conclusion 1 mark Correct z-score calculation method with no or incorrect conclusion	2
27 (b) (ii)	Michelle's z-score in Test 2 was 1. Therefore 16% of students achieved a mark higher than her.	1 mark Correct answer	1
27 (c) (i)	Sonal	1 mark Correct answer	1
27 (c) (ii)	Interquartile range = 4	1 mark Correct answer	1
27 (c) (iii)	Any three valid comments	3 marks Three correct statements 2 marks Two correct statements 1 marks One correct statements	3

Question	Solution	Criteria	Marks
27 (d)	$A = M \left[\frac{(1+r)^n - 1}{r} \right]$ $9600 = 240 \left[\frac{(1+0.005)^n - 1}{0.005} \right]$ $9600 = 240 \left[\frac{1.005^n - 1}{0.005} \right]$ $40 = \frac{1.005^n - 1}{0.005}$ $0.2 = 1.005^n - 1$ $1.2 = 1.005^n$ $1.005^n = 1.2$ $n = 36.55539636$ $= 37 \text{ months}$ <p>or Using graphic calculator: $n = 0$ $I = 6\%$ $PV = 0$ $PMT = 240$ $FV = -9600$ $P/Y = 12$ $C/Y = 12$ $\therefore 36.55539636 \approx 37 \text{ months}$</p>	3 marks Correct answer 2 marks Use of FV formula and correct substitution 1 mark Use of FV formula	3
28 (a) (i)	8 am Friday in Sydney = 10 pm Thursday in London After 22 hour flight, time in London is 8pm Friday	2 marks Correct answer 1 mark Correct working towards answer	2
28 (a) (ii)	$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$ $= \frac{17000}{22}$ $= 772.727272 \text{ km / h}$ $= 417.239348 \text{ knots}$ $\approx 417 \text{ knots}$	2 marks Correct answer in knots 1 mark Correct answer in km/h	2
28 (a) (iii)	Let x be the amount of fuel used $\frac{x}{22} = \frac{184}{22.75}$ $22.75x = 4048$ $x = 177.93406593$ $\approx 178 \text{ tonnes}$	2 marks Correct answer 1 mark Correct ratio	2

Question	Solution	Criteria	Marks
28 (b) (i)	Let x be the length and y be the width. Perimeter = $x + y + x + y = 16$ $2x + 2y = 16$ $2(x + y) = 16$ $x + y = 8$ $y = 8 - x$ Area = lb $= x(8 - x)$ $= 8x - x^2$	2 marks Correct, logical argument 1 marks Significant progress towards solution	2
28 (b) (ii)	Values of areas: 0, 7, 12, 15, 16, 15, 12, 7, 0	2 marks Table copied and all areas correct 1 mark Most areas correct	2
28 (b) (iii)	<p style="text-align: center;">Area of Vegetable Patch</p>	2 marks Correct, neatly labelled graph 1 mark Correct graph without clear labels or with some incorrect points	2
28 (b) (iv)	From graph: Maximum area = 16 m^2 This occurs when $x = 4$. So length and width must be 4 m.	1 mark Correct answer	1