SCOTTISH QUALIFICATIONS AUTHORITY

2006 Mathematics

Standard Grade General

Finalised Marking Instructions

Special Instructions

1 The main principle in marking scripts is to give credit for the skills which have been demonstrated. Failure to have the correct method may not preclude a pupil gaining credit for the calculations involved or for the communication of the answer.

Care should be taken to ensure that the mark for any question or part question is entered in the correct column, as indicated by the horizontal line.

Where a candidate has scored zero marks for any question attempted, "0" should be shown against the answer in the appropriate column.

It is of great importance that the utmost care should be exercised in adding up the marks. Where appropriate, all summations for totals and grand totals must be carefully checked.

2 The answer to one part, correct **or incorrect** must be accepted as a basis for subsequent dependent parts of a question. Full marks in the dependent part is possible if it is of equivalent difficulty.

3 Do not penalise insignificant errors. An insignificant error is one which is significantly below the level of attainment being assessed.

eg An error in the calculation of 16 + 15 would not be penalised at Credit Level.

4 Working after a correct answer should **only** be taken into account if it provides **firm** evidence that the requirements of the question have not been met.

5 In certain cases an error will ease subsequent working. **Full** credit cannot be given for this subsequent work but **partial** credit may be given.

6 Accept answers arrived at by inspection or mentally, where it is possible for the answer to have been so obtained.

7 Do not penalise omission or misuse of units unless marks have been specifically allocated to units.

8 A wrong answer without working receives no credit unless specifically mentioned in the marking scheme.

The rubric on the outside of the Papers emphasises that working must be shown. In general markers will only be able to give credit to partial answers if working is shown. However there may be a few questions where partially correct answers unsupported by working can still be given some credit. **Any such instances will be stated in the marking scheme.**

9 Acceptable alternative methods of solution can only be given the marks specified, ie a more sophisticated method cannot be given more marks.

Note that for some questions a method will be specified.

10 In general do not penalise the same error twice in the one question.

11 Accept legitimate variations in numerical/algebraic questions.

12 Do not penalise bad form eg $\sin x^0 = 0{\cdot}5 = 30^0$.

13 A transcription error is not normally penalised except where the question has been simplified as a result.

Mathematics Standard Grade − General Level 2006 – Paper 1

Marking Instructions

Award marks in whole numbers only

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
1 (a)	**Ans: 1 · 93**	
	$\bullet^1$ Correct addition followed by correct subtraction	$\bullet^1$ 1 · 93 1K
(b)	**Ans: 91 000**	
	$\bullet^1$ Correctly multiply 13 by 7000	$\bullet^1$ 91 000 1K
(c)	**Ans: 0 · 113**	
	$\bullet^1$ Correctly divide 56 · 5 by 500	$\bullet^1$ 0 · 113 1K
(d)	**Ans: 27 · 6 (litres)**	
	$\bullet^1$ Correct division	$\bullet^1$ 9 · 2
	$\bullet^2$ Correct multiplication	$\bullet^2$ 27 · 6 (litres) 2K

Notes:

In part (d)

(i) Correct divisions are by 10 (leading to 9·2) or by 100 (leading to 0·92).

(ii)

Final answers	**with working**	**without working**
27·6	2/2	2/2
2·76 (3%)	1/2	0/2
$30\frac{2}{3}$, 30·6 (92 ÷ 3)	1/2	0/2

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
2	**Ans: (£) 5 · 66** •[1] Correctly divide $8 \cdot 49$ by 3 •[2] Subtract above answer from $8 \cdot 49$ •[3] Correct subtraction	•[1] $2 \cdot 83$ •[2] $8 \cdot 49 - 2 \cdot 83$ •[3] (£) $5 \cdot 66$ 3K

Notes:

(i) **Alternative strategy**

•[1]	Correctly divide 8·49 by 3	•[1] 2·83
•[2]	Multiply above answer by 2	•[2] 2·83 x 2
•[3]	Correct multiplication	•[3] (£)5·66

(ii)

Final answers	**with working**	**without working**
5·66	3/3	2/3
5·69 (using 0·33)	2/3	1/3
5·94 (using 0·3)	2/3	1/3

3	**Ans: ($) $3 \cdot 2 \times 10^8$** •[1] Correct numerical representation •[2] Correct scientific notation	•[1] 320 000 000 •[2] ($) $3 \cdot 2 \times 10^8$ 2K

Notes:

(i) For correct final answer of $3{\cdot}2 \times 10^8$ with or without working – award 2/2.

(ii)

Solutions	**with/without working**
320 000 000	1/2
320 x 1 000 000	1/2
32×10^7	1/2
320×10^6	1/2
$3{\cdot}2 \times 10^2$	1/2.

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
4 (a)	**Ans:** <table><tr><td>**1**</td><td>**2**</td><td>**3**</td><td>**4**</td><td>**5**</td></tr><tr><td>**5**</td><td>**8**</td><td></td><td>**14**</td><td>**17**</td></tr></table>	
	•[1] No. of dots for 1 and 2 stars	•[1] 5, 8
	•[2] No. of dots for 4 and 5 stars	•[2] 14, 17 2R
(b)	**Ans:** $d = 3s + 2$	
	•[1&2] Correct formula	•[1&2] $d = 3s + 2$ 2R
(c) (i)	**Ans:** **30**	
	•[1] Correctly dividing 300 by 10	•[1] 30 1R
(ii)	**Ans:** **92**	
	•[1] Correct strategy	•[1] $3 \times 30 + 2$
	•[2] Correct calculation	•[2] 92 2R

Notes:

In part (b)

(i) For an answer of (=) $3s + 2$ – award 1/2.

(ii) Do not penalise bad form eg $d = 2s + 2 + s$.

(iii) A formula in words is not acceptable.

(iv) For $s = 3d + 2$ – award 0/2.

In part (c) (ii)

(i) Solution may be obtained by extending table.

(ii) For a correct final answer of 92 without working – award 2/2.

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
5	**Ans:** $-\frac{3}{8}$	
	$\bullet^1$ Evidence of 3 and 8	$\bullet^1$ 3 and 8
	$\bullet^2$ Correctly forming gradient	$\bullet^2$ $-\frac{3}{8}$ 2K
Note: For a final answer of $-\frac{3}{8}$ without working – award 2/2.		
6 (a)	**Ans:** $\frac{3}{10}$	
	$\bullet^1$ Correctly finding P(blue)	$\bullet^1$ $\frac{3}{10}$ 1K
(b)	**Ans:** $\frac{2}{7}$	
	$\bullet^1$ Correct subtraction to find number of balls in box	$\bullet^1$ 10 - 3 = 7
	$\bullet^2$ Calculating P(green)	$\bullet^2$ $\frac{2}{7}$ 2R
Notes: In part (b) (i) For a final answer of $\frac{2}{7}$ without working – award 2/2. (ii) Accept variations in language eg 2 out of 7, 2 – 7, 2 to 7, 2:7.		

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
7 (a)	**Ans: $3\frac{1}{2}$ (hours)**	
	$\bullet^1$ Finding time difference	$\bullet^1$ 8am to 11:30 am = $3\frac{1}{2}$ (hours) 1R
(b)	**Ans: $9\frac{1}{2}$ (hours)**	
	$\bullet^1$ Finding 2 more time differences	$\bullet^1$ Two from 2, 2½, 1½
	$\bullet^2$ Finding remaining time difference	$\bullet^2$ Remaining time difference
	$\bullet^3$ Correctly adding times to answer in (a)	$\bullet^3$ $9\frac{1}{2}$ (hours) 3R

Notes:

In part (a) Allow ± 5 min on reading from graph.

In part (b)

Final answers		**with working**	**without working**
9½	(3½ + 2 + 2½ + 1½)	3/3	2/3
8	(3½ + 2 +2½)	2/3	0/3
7	(3½ + 2 + 1½)	2/3	0/3
7½	(3½ + 2½ +1½)	2/3	0/3
6	(2 + 2½ +1½)	2/3	0/3

8 (a)	**Ans:** **1 | 0 5** **2 | 3 5 5 8** **3 | 0 2 3 4 5 8** **4 | 1 2 4 6** **5 | 2 5** **6 | 2** **(n=19 15=15)**	
	$\bullet^1$ Stem correct	$\bullet^1$
	$\bullet^2$ All leaves on correct level	$\bullet^2$
	$\bullet^3$ Leaves ordered correctly	$\bullet^3$ 3K
(b)	**Ans: 34**	
	$\bullet^1$ Median correctly identified	$\bullet^1$ 34 1K

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
9	**Ans: 14°** •[1] Knowing ∠OLM is right angled •[2] Knowing how to find ∠LOK •[3] ∠LMO calculated correctly	•[1] ∠OLM = 90° •[2] 180 – 2 × 52 (= 76°) •[3] 180 – (90 + 76) = 14° 3R

Notes:

(i) **Alternative strategy**

•[1]	Knowing ∠OLM is right angled	•[1] 90
•[2]	Knowing how to find ∠KLM and ∠LKM	•[2] 90 – 52 (= 38°), 180 – 52 (= 128°)
•[3]	∠LMO calculated correctly	•[3] 180 – (38 + 128) = 14°

(ii)

Final answers	**with working**	**without working**
14	3/3	2/3
38 (from ∠LOK = 52°)	2/3	0/3
26 (from ∠LOK and/or ∠KLO = 64°)	2/3	0/3
7 (from ∠LOK = 83°)	2/3	0/3

(iii) Angles correctly marked on diagram may be accepted.

KU 17 marks
RE 16 marks

[END OF PAPER 1 MARKING INSTRUCTIONS]

Mathematics Standard Grade − General Level 2006 – Paper 2

Marking Instructions

Award marks in whole numbers only

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
1	**Ans: (£) 1185**	
	•[1] Find correct cost of 7 nights	•[1] 825
	•[2] Calculate cost of 5 extra nights	•[2] $5 \times 72 = 360$
	•[3] Correct addition of above	•[3] $825 + 360 = 1185$ 3K
Note: For a final answer of 864 (12 x 72) with working – award 1/3		
2	**Ans: 270 pages**	
	•[1] Divide 63 by 7	•[1] $63 \div 7$
	•[2] Multiply above answer by 30	•[2] 9×30
	•[3] Calculations correct	•[3] 270 3K

Notes:

(i) Calculations must include multiplication and division.

(ii) For a final answer of 252 (28 minutes) or 315 (35 minutes) with working – award 1/3

(iii) **Alternative strategy**

•[1] Divide 30 by 7	•[1] $30 \div 7$
•[2] Multiply above answer by 63	•[2] 4·29 x 63
•[3] Calculations correct	•[3] 270 (·27)

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
3	**Ans:** $\begin{array}{\|c\|c\|c\|c\|c\|}\hline 6 & 0 & 0 & 0 & 30 \\ \hline 5 & 1 & 0 & 0 & 28 \\ \hline 5 & 0 & 1 & 0 & 27 \\ \hline 5 & 0 & 0 & 1 & 25 \\ \hline 4 & 1 & 1 & 0 & 25 \\ \hline \end{array}$ $\bullet^1$ For one correct row $\bullet^2$ For a second correct row $\bullet^3$ For a third correct row $\bullet^4$ For two final rows correct	4R
Comment: • Please mark according to marking instructions • Scripts from centres where the Chief Invigilator has reported that the Correction Notice had not been read out will be actioned by the PA prior to certification.		
4	**Ans: 176·1 (cm)** $\bullet^1$ Valid trig ratio $\bullet^2$ Correct rearranging $\bullet^3$ Correct calculation involving trig ratio $\bullet^4$ Correct rounding	$\bullet^1$ $\cos 12° = d/180$ $\bullet^2$ $d = 180 \times \cos 12°$ $\bullet^3$ $d = 176 \cdot 06657 \ldots$ $\bullet^4$ $d = 176 \cdot 1$ (cm) 4K

Notes:

(i) Final mark is for correct rounding following a calculation

(ii) Credit should be given where a more laborious method is used

(iii)

Final answers	**with working**	**without working**
176·1	4/4	3/4
151·9 [RAD]	4/4	3/4
176·8 [GRAD]	4/4	3/4
37·4 ($180 \times \sin 12$)	3/4	0/4
38·3 ($180 \times \tan 12$)	3/4	0/4

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
5	**Ans: 12 (hours)**	
	$\bullet^1$ Knowing how to calculate basic pay	$\bullet^1$ $54 \times 5 \cdot 6 (= 302 \cdot 4)$
	$\bullet^2$ Knowing to subtract to find O/T pay	$\bullet^2$ $436 \cdot 8 - 302 \cdot 4 (= 134 \cdot 4)$
	$\bullet^3$ Knowing how to calculate O/T rate	$\bullet^3$ $5 \cdot 6 \times 2 (= 11 \cdot 2)$
	$\bullet^4$ Knowing to divide O/T pay by O/T rate to find number of hours and all calculations correct (min. 2, must involve a division)	$\bullet^4$ $134 \cdot 4 \div 11 \cdot 20 = 12$ (hours) 4R
Notes:		
(i) **Alternative strategy**		
$\bullet^1$ Knowing how to calculate total no. of hours worked.		$\bullet^1$ 436·80 ÷ 5·60 (= 78)
$\bullet^2$ Knowing to subtract 54 from above		$\bullet^2$ 78 – 54 (= 24)
$\bullet^3$ Knowing to divide above by 2		$\bullet^3$ 24 ÷ 2
$\bullet^4$ All calculations correct, (min 2, must involve a division)		$\bullet^4$ = 12 (hours)
(ii) For a final answer of 12 (hours) without working – award 2/4		
6 (a)	**Ans: $3(2a + 5b)$**	
	$\bullet^1$ Finding highest common factor	$\bullet^1$ 3
	$\bullet^2$ Correct factorisation	$\bullet^2$ $(2a + 5b)$ 2K
(b)	**Ans: $x = 8$**	
	$\bullet^1$ x terms gathered	$\bullet^1$ $3x$
	$\bullet^2$ Number terms gathered	$\bullet^2$ 24
	$\bullet^3$ Correct solution	$\bullet^3$ $x = 8$ 3K
Note: In part (b) for $x = 8$ without working – award 0/3.		

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
7	**Ans: 10 (min)**	
	$\bullet^1$ Knowing to use formula to find time	$\bullet^1$ $T = 80 \div 60$
	$\bullet^2$ Correct time calculation	$\bullet^2$ $= 1 \cdot 3 \ldots$
	$\bullet^3$ Knowing to change above answer into hours and minutes	$\bullet^3$ 1 hr 20 min
	$\bullet^4$ Correct time difference	$\bullet^4$ 10 (min) 4R

Notes:

(i) **Alternative strategy**

$\bullet^1$	Valid strategy	$\bullet^1$	60 km—— 1 hr
$\bullet^2$	Correct time calculation	$\bullet^2$	20 km—— 20 min
$\bullet^3$	Correct journey time	$\bullet^3$	1 hr 20 min
$\bullet^4$	Correct time difference	$\bullet^4$	10 (min)

(ii)

Final answers	**with working**	**without working**
10 (min)	4/4	3/4
0·166… (hr)	4/4	3/4
0·17 (hr) (1·5 - 1·33)	3/4	2/4
12 (min) (1·3 leading to 1 hr 18 min)	3/4	2/4
10·2 (min) (1·33 leading to 1 hr 19·8 min)	3/4	2/4
3 (min) (1·33 leading to 1 hr 33 min)	3/4	0/4
45 (min) (60 ÷ 80 leading to 45 min)	3/4	0/4

8	**Ans: 20 · 7 (m)**	
	$\bullet^1$ Correct use of Pythagoras' Theorem	$\bullet^1$ $4 \cdot 3^2 + 2 \cdot 9^2$
	$\bullet^2$ Correct Pythagoras calculation	$\bullet^2$ 26·9
	$\bullet^3$ Correct square root of above	$\bullet^3$ 5·18…
	$\bullet^4$ Correct multiplication of above by 4	$\bullet^4$ P = 20 · 7 (m) 4K

Note:

For a final answer of 20·7 or 20·8 (4 × 5·2) without working – award 3/4

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
9 (a)	**Ans: 0 · 442**	
	$\bullet^1$ Calculating area of $\frac{1}{4}$ circle	$\bullet^1$ $\frac{1}{4} \times \pi \times 0 \cdot 75^2$
	$\bullet^2$ Correct calculation involving π	$\bullet^2$ $0 \cdot 4...$ 2K
(b)	**Ans: twice**	
	$\bullet^1$ Knowing to calculate no. of times desk can be painted	$\bullet^1$ $\frac{1}{0 \cdot 4...}$
	$\bullet^2$ Interpreting answer correctly	$\bullet^2$ twice 2R

Notes:

In parts (a) and (b) for a correct final answer without working – award 2/2

In part (a) for a final answer of 1·7… with or without working – award 1/2

In part (b) (i) The final answer must be a whole number

(ii) Any valid comparison can lead to an award of 2/2

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
10 (a)	**Ans: (£) 114**	
	$\bullet^1$ Correct information chosen from table	$\bullet^1$ 28 and 15
	$\bullet^2$ Correct calculation	$\bullet^2$ $3 \times 28 + 2 \times 15 = (£)\ 114$ 2K
(b)	**Ans: No, it will cost her £6 more**	
	$\bullet^1$ Knowing to calculate the number of hours Maria is at nursery	$\bullet^1$ $3 \times 6 + 2 \times 3 = 24$ hours
	$\bullet^2$ Knowing to multiply no. of hours by 5 and calculations correct	$\bullet^2$ $24 \times 5 =$ £120
	$\bullet^3$ Compares cost with answer to (a)	$\bullet^3$ No 120 > 114 ie £6 more per week 3R

Notes:

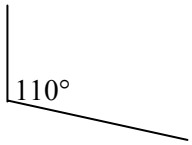
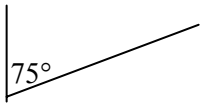
In part (a) For a correct final answer without working – award 2/2

In part (b)

(i) For correct reason involving correct comparison without further working – award 3/3

(ii) **Alternative strategy**

$\bullet^1$ Calculating the cost of $\frac{1}{2}$ days and full days	$\bullet^1$ 15 and 30
$\bullet^2$ Comparing the cost of $\frac{1}{2}$ days	$\bullet^2$ 15 = 15, ie cost is same
$\bullet^3$ Comparing the cost of full days	$\bullet^3$ 30 > 28, ie £2 more per full day

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
11	**Ans: Position of ship shown** •[1] Draws line on bearing 110° from Lossiemouth correctly •[2] Draws line on bearing 075° from Leuchars correctly •[3] Extends lines to show position of ship	•[1]  •[2]  •[3] 3R
Note: Allow ±2° tolerance No marks can be awarded to candidates who mark a position for the ship without showing construction lines		

Question No	Give 1 mark for each	Illustrations of evidence for awarding each mark
12	**Ans: (£) 55·08**	
	•[1] Knowing to calculate price for a new customer	•[1] $\frac{1}{5}$ of $765 = 153$ $765 - 153\ (= 612)$
	•[2] Knowing to find 8% of above answer and add to above	•[2] $0 \cdot 08 \times 612 = 48 \cdot 96$ $612 + 48 \cdot 96\ (= 660.96)$
	•[3] Knowing to find monthly installment	•[3] $660.96 \div 12$
	•[4] All calculations correct within valid strategy	•[4] $= (£)\ 55 \cdot 08$ 4R

Notes:

(i) **Alternative strategy**

•[1] Knowing to find base monthly premium	•[1] 765 ÷ 12 = 63·75
•[2] Knowing to find monthly premium for new customer	•[2] 63·75 ÷ 5 = 12·75 63·75 - 12·75 = 51
•[3] Knowing to find 8% of above and add to above	•[3] 8% of 51 = 4·08 51 + 4·08
•[4] All calculations correct	•[4] =(£) 55·08

(ii)

Final answers	**with working**	**without working**
55·08	4/4	3/4
68·85	3/4	0/4
46·92	3/4	0/4
13·77	3/4	0/4
4·08	3/4	0/4
624·24	2/4	0/4
165·24	2/4	0/4
12·24	1/4	0/4

KU 23 marks
RE 24 marks

[END OF MARKING INSTRUCTIONS]

FINAL TOTALS	**KU 40** **RE 40**