2010 Mathematics

Standard Grade − General

Paper 1 and Paper 2

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 are 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.

14 When multiple solutions are presented by the candidate and it is not clear which is intended to be the final one, mark all attempts and award the lowest mark.

2010 Mathematics SG − General Level − 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: 7·99** •[1] correct subtraction and addition	•[1] 7·99 **1K**
(b)	**Ans: 300·8** •[1] correct multiplication	•[1] 300·8 **1K**
(c)	**Ans: 6·7** •[1] correct division	•[1] 6·7 **1K**
(d)	**Ans: 16⅓** •[1] correct multiplication by 7 •[2] correct addition	•[1] 14 and 7/3 •[2] 16⅓ **2K**

NOTES:

In part (d)

(i) **Alternative Strategy**

•[1] correct strategy •[1] 7 × 7/3

•[2] correct solution •[2] 49/3

(ii) Acceptable final answers 16⅓, $16^2/_6$, 49/3, with or without working

(iii) Where the fraction is correctly rounded to a decimal award 1/2

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
2	**Ans: $5{\cdot}8 \times 10^9$** •[1] correct positioning of decimal point •[2] correct power of ten in a correct expression	•[1] $5{\cdot}8$ •[2] $5{\cdot}8 \times 10^9$ **2K**

NOTES:

(i) The second mark can be awarded for a consistent power of 10, eg 58×10^8

(ii)

Final answers	**with working**	**without working**
$5{\cdot}8 \times 10^9$	2/2	2/2

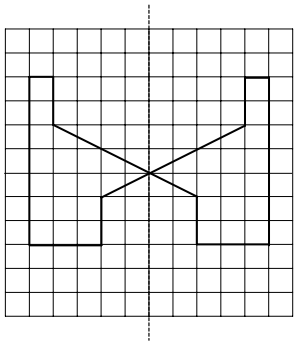
3	**Ans: 23(°C)** •[1] evidence of subtraction of a negative number •[2] correct calculation	•[1] $8 - (-15)$ •[2] 23(°C) **2K**

NOTES:

(i)

Final answers	**with working**	**without working**
23	2/2	2/2
−23	1/2	0/2

(ii) The use of a number line from −15 to 8 is acceptable for the first mark

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
4	**Ans: see diagram** •[1] one line correctly reflected •[2] a further two lines correctly reflected •[3] reflection completed	•[1] •[2] •[3]  **3R**
NOTES: (i) For a correct reflection of the drawing in a line other than the dotted line – within the grid award 2/3 – not wholly within the grid award 1/3 (ii) Where a candidate adds a line(s) to the design and reflects it, treat as working after a correct answer		
5	**Ans:** **1 | 1 2 3 4 4 5 5 6 7 7** **2 | 1 6 7** **3 | 1 2 3** **4 | 2 4 6** **5 | 1** •[1] stem correct •[2] leaves on correct level •[3] leaves ordered correctly	•[1] see diagram •[2] see diagram •[3] see diagram **3K**
NOTE: (i) Accept the use of commas or decimal point as bad form		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
6 (a)	**Ans: 14, 18, 22, 50** Number of alphabet tiles *(a)*: 1 | 2 | 3 | 4 | 5 | | 12 Number of coloured tiles *(c)*: 6 | 10 | **14** | **18** | **22** | | **50**	
	$\bullet^1$ any two entries correct $\bullet^2$ two further correct entries	$\bullet^1$ eg 14, 18 $\bullet^2$ eg 22, 50 **2R**
(b)	**Ans: $c = 4a + 2$** $\bullet^1$ $\bullet^2$ correct formula	$\bullet^1$ $\bullet^2$ $c = 4a + 2$ **2R**
(c)	**Ans: 21** $\bullet^1$ correct substitution $\bullet^2$ correct answer	$\bullet^1$ $4a + 2 = 86$ $\bullet^2$ ($a =$)21 **2R**

NOTES:

In part (b)

(i) For an answer of (=) $4a + 2$ award 1/2
(ii) Do not penalise bad form, eg $c = 3a + a + 2$
(iii) A formula in words is not acceptable
(iv) For $a = 4c + 2$ award 0/2

In part (c)

(v) The solution may be obtained from extending the table
(vi) For $86 \div 4 - 2$ leading to an answer of eg 19, 19·5, 20 award 1/2
(vii) For a final answer of 21 without working award 1/2

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
7	**Ans: (£)50** •[1] knowing to divide 65 by 13 •[2] knowing to multiply by 10 •[3] calculations correct within valid strategy	•[1] 65 ÷ 13 (= 5) •[2] 10 × 5 (= 50) •[3] (£)50 **3R**

NOTES:

(i) **Alternative Strategy**

•[1]	knowing to divide 13 by 10	•[1] 13 ÷ 10 = 1·3
•[2]	knowing to divide 65 by 1·3	•[2] 65 ÷ 1·3
•[3]	calculations correct within valid strategy	•[3] 50

(ii)

Final answers	**with working**	**without working**
50	3/3	2/3
84·50	2/3	0/3

(iii) Solution may be obtained from successive additions

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
8	**Ans: 20(%)** •[1] subtract 320 from 400 •[2] correct fraction •[3] conversion of fraction to percentage	•[1] 400 – 320 = 80 •[2] 80 ÷ 400 •[3] 20(%) **3K**
NOTE: (i) **Alternative Strategies** •[1] find 10% •[1] 10% of 400 = 40 •[2] find reduction •[2] 400 − (2 × 40) = 320 •[3] find % reduction •[3] reduction = 20(%) •[1] divide 320 by 400 •[1] 320/400 = 0·8 •[2] find 320 as a % of 400 •[2] 0·8 × 100 = 80% •[3] find % reduction •[3] 100 − 80 = 20(%) (ii) For a correct final answer without working award 1/3		
9	**Ans: l = 20(cm) b = 16(cm)** •[1] correctly calculate length •[2] correctly calculate breadth	•[1] 4 + 12 + 4 = 20(cm) •[2] 5 + 6 + 5 = 16(cm) **2R**
NOTES: (i) For answer(s) of l(ength) = 20 and/or b(readth) = 16, without working award 1 mark for each (ii) For answer(s) of 20 and/or 16 without working no marks can be awarded		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
10	**Ans: 21(°)** •[1] knowing to calculate angle AOD •[2] knowing to calculate angle BOC •[3] correctly calculate angle BCO	•[1] 180 – (62 + 62) •[2] 180 – 56 •[3] 180 – (124 + 35) = 21(°) **3R**

NOTE:

(i)	**Final answers**	**with working**	**without working**
	21	3/3	2/3
	24 (from AOD = 59°)	2/3	0/3
	48 (from BOC = 97°)	1/3	0/3

KU 15 marks
RE 17 marks

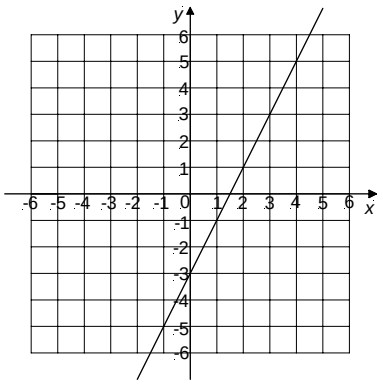
[END OF PAPER 1 MARKING INSTRUCTIONS]

2010 Mathematics SG − General Level – 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 (a)	**Ans: 112** •[1] correctly calculate range	•[1] 310 – 198 = 112 **1K**
(b)	**Ans: 255** •[1] correctly order list •[2] correctly add middle two numbers in list and half	•[1] 198, 200, 225, 245, 250, 260, 275, 300, 310, 310 •[2] 255 **2K**
NOTES: In part (b) (i) 255 can be **incorrectly** obtained from adding 310 & 200 and halving (ii) **Final answers** 255 — **with working** 2/2 — **without working** 0/2		
2	**Ans: (£)1280** •[1] correct price for either outer or inner cabin •[2] correct price for one child •[3] correct total cost	•[1] 310 or 275 •[2] 275 – (275 × 0·2) = 220 •[3] (2 × 310) + (3 × 220) = (£)1280 **3K**
NOTE: (i) **Final answers** 1280 — **with working** 3/3 — **without working** 2/3 1294 (310 & 275 swapped) — 2/3 — 0/3		

<table>
<tr><th>Question No</th><th>Give 1 mark for each •</th><th>Illustrations of evidence for awarding each mark</th></tr>
<tr><td>3</td><td colspan="2">Ans:
<table>
<tr><th>Apples</th><th>Oranges</th><th>Grapes</th><th>Pears</th><th>Melon</th><th>Cost</th></tr>
<tr><td>✓</td><td>✓</td><td></td><td>✓</td><td></td><td>£4·01</td></tr>
<tr><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td>£4·94</td></tr>
<tr><td>✓</td><td>✓</td><td></td><td></td><td>✓</td><td>£4·43</td></tr>
<tr><td>✓</td><td></td><td></td><td>✓</td><td>✓</td><td>£4·79</td></tr>
<tr><td></td><td>✓</td><td></td><td>✓</td><td>✓</td><td>£4·74</td></tr>
</table></td></tr>
<tr><td></td><td>•1 one selection correct
•2 a further selection correct
•3 a further selection correct
•4 a further selection and all prices correct</td><td>•1 see table
•2 see table
•3 see table
•4 see table
4R</td></tr>
<tr><td>4 (a)</td><td>Ans: −5, −1, 3
•1 one value correct
•2 a further two values correct</td><td>•1 eg 3
•2 eg −1, −5
2K</td></tr>
<tr><td>(b)</td><td>Ans: Correct line
•1 2 points plotted correctly
•2 correct straight line drawn</td><td>•1
•2
 

2K</td></tr>
<tr><td colspan="3">NOTES:

In part (b)
(i) If line y = 2x – 3 is correctly drawn award 2/2

(ii) Where the correct straight line hasn't been drawn, to obtain the 2nd mark the line drawn must pass through all three of the candidate's points</td></tr>
</table>

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
5	**Ans: Yes, speed only 15 mph**	
	•[1] beginning to find speed or equivalent	•[1] S = 0·5/2; D = 20 × 2; T = 0·5/20
	•[2] correct speed calculation or equivalent	•[2] S = (0·5/2) × 60 = 15
	•[3] correct conclusion with reason	•[3] = 15 mph, so van is travelling at a safe speed
		3R

NOTES:

(i) **Alternative Strategy**

•[1]	correct strategy	•[1] 2 mins ----- ½ mile
•[2]	correct proportion calculation	•[2] 60 mins ----- 15 miles
•[3]	correct conclusion with reason	•[3] = 15 mph, so van is travelling at a safe speed

(ii) For a correct final answer and correct conclusion without working award 1/3

(iii) The reason must include a comparison or an implied comparison eg using 'only', 'more than', 'less than' or 'safe speed'

(iv) Ignore variations in rounding

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
6 (a)	**Ans: 13*c* – 14** •[1] correct expansion of 1st bracket •[2] correct expansion of 2nd bracket •[3] correct simplification	•[1] $8c - 24$ •[2] $5c + 10$ •[3] $13c - 14$ **3K**
(b)	**Ans: $x = 3$** •[1] correct number term •[2] correct value for x	•[1] $(7x =)\ 21$ •[2] $x = 3$ **2K**

NOTES:

(i)

Final answers	**with working**	**without working**
(a) $13c - 14$	3/3	2/3
(b) $x = 3$	2/2	0/2

(ii) In part (a) where a candidate creates then tries to solve an equation the 3rd mark cannot be awarded

(iii) In part (b) for $x = 3$ without algebraic working award 0/2

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
7	**Ans: (£)125**	
	$\bullet^1$ strategy for groups of four	$\bullet^1$ $3 \times 3 + 1$
	$\bullet^2$ knowing to find the cost of groups of four	$\bullet^2$ $3 \times 37{\cdot}50$
	$\bullet^3$ total cost and all calculations correct	$\bullet^3$ $112{\cdot}50 + 12{\cdot}50 = (£)125$ **3R**

NOTES:

(i) **Alternative Strategies**

$\bullet^1$	strategy for groups of four	$\bullet^1$ $3 \times 3 + 1$
$\bullet^2$	knowing to multiply	$\bullet^2$ $10 \times 12{\cdot}50$
$\bullet^3$	all calculations correct	$\bullet^3$ $(£)125{\cdot}00$
$\bullet^1$	find cost of 13 tickets	$\bullet^1$ $13 \times 12{\cdot}50$
$\bullet^2$	strategy	$\bullet^2$ $13 \times 12{\cdot}50 - (3 \times 12{\cdot}50)$
$\bullet^3$	all calculations correct	$\bullet^3$ $(£)125{\cdot}00$

(ii) The third mark can only be awarded to candidates who perform at least two calculations

(iii) For a correct final answer without working award 2/3

8	**Ans: 400**	
	$\bullet^1$ identify angle for Conservative	$\bullet^1$ 80
	$\bullet^2$ correct division by 360 or equivalent	$\bullet^2$ $80 \div 360 = 0{\cdot}22...$
	$\bullet^3$ correct multiplication by 1800 or equivalent	$\bullet^3$ $0.22... \times 1800 = 400$ **3K**

NOTES:

(i) **Alternative Strategy**

$\bullet^1$	identify angle for Conservative	$\bullet^1$ 80
$\bullet^2$	identify number of votes for 1°	$\bullet^2$ $1800 \div 360 = 5$
$\bullet^3$	correct multiplication	$\bullet^3$ $5 \times 80 = 400$

(ii) For a correct final answer without working award 2/3

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
9	**Ans: 70(m)** •[1] knowing to calculate length of court •[2] knowing to calculate perimeter •[3] correct calculations in a valid strategy	•[1] 264 ÷ 11 (= 24) •[2] (2 × 24) + (2 × 11) •[3] 48 + 22 = 70(m) **3R**

NOTE:

(i)	**Final answers**	**with working**	**without working**
	70	3/3	2/3
	35	2/3	0/3

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
10	**Ans: 30·1(°)** •[1] valid trig ratio •[2] correct value for Cos*x* or equivalent •[3] correct angle	•[1] Cos $x = 4{\cdot}5/5{\cdot}2$ •[2] Cos $x = 0{\cdot}865$ or $x = \text{Cos}^{-1}(4{\cdot}5/5{\cdot}2)$ •[3] 30·1**(°)** **3K**
NOTE: (i) **Final answers** / **with working** / **without working** 30·1 / 3/3 / 0/3 (measures 30° on diag) 0·52 [RAD] / 3/3 / 0/3 33·4 [GRAD] / 3/3 / 0/3		
11 (a)	**Ans: 82·5 (km)** •[1] correct use of scale	•[1] 5·5 (± 0·2cm) × 15 = 82·5 (km) **1K**
(b)	**Ans: 330 (± 2)°** •[1] start to find bearing •[2] find bearing	•[1] 30 (± 2)° or 60 (± 2)° •[2] 360 – 30 = 330 (± 2)° or 270 + 60 = 330 (± 2)° **2R**
NOTE: (i) **Final answers** / **with working** / **without working** (a) 82·5 (± 3) / 1/1 / 1/1 (b) 330 (± 2) / 2/2 / 2/2		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
12	**Ans: 26·8 (cm)**	
	•[1] knowing to find length of short side	•[1] $3 \div 2 = 1{\cdot}5$
	•[2] knowing to use Pythagoras	•[2] $x^2 = 5^2 + 1{\cdot}5^2$
	•[3] correct Pythagoras calculation	•[3] $x = 5{\cdot}2$
	•[4] correct length calculation	•[4] $(5{\cdot}2 + 5{\cdot}2 + 3) \times 2 = 26{\cdot}8$(cm) **4R**

NOTE:

(i)	**Final answers**	**with working**	**without working**
	26·8	4/4	3/4
	29·2 (from $5^2 + 3^2$)	3/4	0/4
	22 (from $5^2 - 3^2$)	2/4	0/4
	26 (from $(5 + 5 + 3) \times 2$)	1/4	0/4
	12·5 (from $5^2 - 1{\cdot}5^2$)	3/4	0/4

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
13	**Ans: 109900 (cm^3)**	
	$\bullet^1$ evidence of correct conversion of units	$\bullet^1$ 700cm or 0·1m
	$\bullet^2$ correct substitution in volume formula	$\bullet^2$ $V = 3{\cdot}14 \times 10^2 \times 700$ (= 219800)
	$\bullet^3$ correct calculation including dividing by 2 (must involve π)	$\bullet^3$ $V = 219800 \div 2 = 109900(cm^3)$ **3K**

NOTE:

(i)	**Final answers**	**with working**	**without working**
	109900 (cm^3)	3/3	2/3
	0·1099 (m^3)	3/3	2/3
	1099 (mixing units)	2/3	0/3
	2198 (mixing units)	1/3	0/3

14	**Ans: (£)10·2(0)**	
	$\bullet^1$ strategy to find cost of monthly plan	$\bullet^1$ 360 + (5% of 360) = 378
	$\bullet^2$ calculates deposit	$\bullet^2$ 1/5 of 360 = 72
	$\bullet^3$ calculates balance	$\bullet^3$ 378 – 72 = 306
	$\bullet^4$ calculates monthly payment	$\bullet^4$ 306 ÷ 30 = (£)10·2(0) **4R**

NOTE:

(i)	**Final answers**	**with working**	**without working**
	10·2(0)	4/4	3/4
	10·08	3/4	0/4
	302·40	2/4	0/4
	12·60	2/4	0/4
	9·60	2/4	0/4

KU 25 marks
RE 23 marks

[END OF PAPER 2 MARKING INSTRUCTIONS]

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