SCOTTISH
QUALIFICATIONS
AUTHORITY

2005 Mathematics

Standard Grade – Credit Paper 1 and Paper 2

Finalised Marking Instructions

These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments.

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.

2005 Mathematics SG – Credit 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	**Ans: 2·88** • knowing correct order of operations • carrying out both calculations	 • 0·92 • 2·88 2 KU

Notes:

Answer must be a decimal fraction

With or without working:

(i)	2·88	2 marks
(ii)	0·92	1 mark
(iii)	– 0·445	1 mark

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
2	**Ans:** $\mathbf{\frac{21}{6}}$	
	• knowing correct order of operations	• $\frac{5}{6} \times \frac{7}{5}$
	• first calculation	• $\frac{7}{6}$ or $\frac{19}{6}$ or equivalent
	• second calculation	• $\frac{21}{6}$ or $\frac{133}{30}$ or equivalent
		3 KU

Notes:

Answer must not be a decimal fraction.

With or without working:

(i)	$3\frac{1}{2}$	3 marks
(ii)	$7/6$	2 marks
(iii)	$133/30$	2 marks
(iv)	$19/6$	1 mark

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
3	**Ans: £17·50** • valid strategy • evaluation	 • correctly starting calculation • £17·5(0) 2 KU
Notes:		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
4	**Ans:** $\mathbf{\frac{9}{36}}$ • stating number of favourable or total outcomes • probability	 • 9 or 36 • $\frac{9}{36}$ 2 KU

Notes:

(i) $\frac{5}{21}$ with or without working award 1/2

(ii) $\frac{9}{36}$ without working is awarded 2/2

(iii) $\frac{1}{4}$ or equivalent (except 9/36) without working is awarded 0/2

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
5	**Ans:** $y = -2x + 6$ • gradient • y-intercept • consistent equation	 • -2 • 6 • $y = -2x + 6$ 3 KU

Notes:

(i) Third mark is only awarded for an equation consistent with first two marks.

(ii) A wrong gradient may be substituted to give an alternative intercept.

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
6	**Ans: $\frac{2}{5}$**	
	• transposing terms	• $\frac{2}{x} = 5$
	• dealing with denominator of x	• $5x = 2$
	• solution of equation	• $x = \frac{2}{5}$
		3 KU

Notes:

(i) First mark is also awarded for adding the left hand side correctly. $\frac{2+x}{x} = 6$

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
7	**Ans: 80(km/hr)** • starting to construct cumulative frequency column • completing cumulative frequency column • finding median	 • start • completion • 80 (km/hr) 3 KU

Notes:

(i) 80 (km/hr) without working award the final mark

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
8 (a)	**Ans: $5^2 - 3^2$** • term	• $5^2 - 3^2$ 1 RE
Notes:		
(b)	**Ans: $4n$** • correct expression • expanding brackets • simplified expression	• $(n+1)^2 - (n-1)^2$ • $n^2 + 2n + 1 - (n^2 - 2n + 1)$ • $4n$ 3 RE
Notes:		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
9 (a)	**Ans: 25 litres** • number of litres bought • number of litres left	• 40 • 25 2 KU
Notes: 1 mark may be awarded for £30 – (5 × 3 × 75p)		
(b)	**Ans:** $\mathbf{R} = \frac{2000}{\boldsymbol{c}} - \boldsymbol{kt}$ • expression for number of litres bought • expression for number of litres used • formula for number of litres left	• $\frac{2000}{c}$ • kt • $R = \frac{2000}{c} - kt$ 3 RE
Notes: (i) If one variable is replaced by a numerical value the last two marks may be awarded. (ii) If two variables are replaced by numerical values the last mark may be awarded.		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
10	**Ans: 6 cm** • valid strategy • starting process • continuing of process • continuing calculation • consistent solution	 • use of right-angled triangles • 3 • 4 • 3 • 6 5 RE

Notes:

(i) Candidates who use 3·5 as the height of the lower triangle lose the first 3 marks.

(ii) They may gain the 4th mark for:

$x^2 = 5^2 - 3{\cdot}5^2$

(iii) The fifth mark can be awarded if there is evidence of doubling any value of x.

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
11 (a)	**Ans: $25\sqrt{2}$** • substitution • simplifying surd • consistent solution	 • $4\sqrt{72}+\sqrt{2}$ • $6\sqrt{2}$ • $25\sqrt{2}$ 3 KU
Notes:		
(b)	**Ans: $t=\frac{1}{2}$** • forming equation • starting to solve equation • consistent solution	 • $4\sqrt{t}+\sqrt{2}=3\sqrt{2}$ • $4\sqrt{t}=2\sqrt{2}$ • $t=\frac{1}{2}$ 3 RE
Notes:		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
12	**Ans: 3·5 cm**	
	• stating area of triangle	• $\frac{1}{2} \times 2x(2x-5)$
	• forming equation	• $x(2x-5) = 7$
	• standard quadratic equation	• $2x^2 - 5x - 7 = 0$
	• factorising	• $(2x-7)(x+1) = 0$
	• stating valid solution	• 3·5
		5 RE

Notes:

(i) An answer of 3·5 obtained by inspection gains the 5th mark only.

KU 23 marks
RE 20 marks

[END OF PAPER 1 MARKING INSTRUCTIONS]

2005 Mathematics SG – Credit 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	**Ans: $3\cdot 24 \times 10^{15}$** • substitution • dealing with brackets • consistent solution	 • $3{\cdot}6 \times 10^{-2} \times (3 \times 10^{8})^2$ • 9×10^{16} • $3{\cdot}24 \times 10^{15}$ 3 KU

Notes:

For answers without working:

$3{\cdot}24 \times 10^{15}$	award 3/3	mc^2
$1{\cdot}08 \times 10^{7}$	award 2/3	mc
$1{\cdot}1664 \times 10^{14}$	award 2/3	$(mc)^2$
$3{\cdot}888 \times 10^{5}$	award 2/3	m^2c
$3{\cdot}24^{15}$ or $3{\cdot}24E15$	award 2/3	

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
2	**Ans: 79·5, 7·09** • calculating mean • applying s.d. formula • continuing formula • consistent value	 • 79·5 • 251·5 • $\sqrt{\frac{251\cdot5}{5}}$ • 7·09 4 KU

Notes:

(i) The correct answer 7·09/7·1 with no working receives full credit.

(ii) Ignore careless positioning of square root sign for the **third** mark.

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
3	**Ans: 187.5cm^2**	
	• valid strategy	• using area formula
	• continuing strategy	• $\frac{1}{2} \times qr \sin P$
	• substitution	• $\frac{1}{2} \times 19 \times 21 \times \sin 110°$
	• consistent value	• 187.5 cm^2
		4 KU

Notes:

(i) Answer in grads is 197 award 4/4

(ii) Answer in radians is -8·83 award 3/4

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
4	**Ans: 2·2, -4·2**	
	• identifying coefficients	• a = 1, b = 2, c = -9
	• processing	• $\frac{-2 \pm \sqrt{40}}{2}$
	• correctly rounded answers	• 2·2, -4·2
		3 KU
Notes:		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
5	**Ans: not right-angled**	
	METHOD 1	
	• valid strategy	• converse of Pythagoras' Theorem
	• evaluation	• 12 100 and 11 700
	• valid conclusion	• $110^2 \neq 60^2 + 90^2$
		3 RE
	METHOD 2	
	• valid strategy	• Pythagoras' Theorem
	• evaluation	• h = 108·17
	• valid conclusion	• $108{\cdot}17 \neq 110$
	METHOD 3	
	• valid strategy	• cosine rule
	• evaluation	• angle = 92·1°
	• valid conclusion	• $92{\cdot}1^\circ \neq 90^\circ$

Notes:

The third mark requires a specific numerical comparison.

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
6	**Ans: 48 metres** • valid strategy • forming equation • processing • valid solution	 • use of similar triangles • $\frac{h}{20} = \frac{12}{5}$ or $\frac{x}{25} = \frac{12}{5}$ • $5h = 240$ $5x = 300$ • 48 $x = 60 / h = 48$ 4 RE
Notes:		

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
7	**Ans: 11·0 kilometres**	
	• calculation of angle AVB	• 116°
	• use of sine rule in Δ AVB	• $\dfrac{b}{\sin B} = \dfrac{v}{\sin V}$
	• substitution	• $\dfrac{5}{\sin 24°} = \dfrac{v}{\sin 116°}$
	• processing	• $v = \dfrac{5 \sin 116°}{\sin 24°}$
	• valid solution	• 11·0
		5 KU

Notes:

With working

5·26	award 4/5	(<B = 66°, <V = 74°)
7·9	award 4/5	(wrong side)
3·5	award 3/5	(wrong angle, wrong side)

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
8	**Ans: 6 centimetres** • expression for volume • expression for surface area • equating volume and surface area • finding correct value of x • length of side	 • $8x^3$ • $24x^2$ • $8x^3 = 24x^2$ • $x = 3$ • side = 6 cm 5 RE

Notes:

If $x = 3$ or side = 6 is assumed, a maximum of 3/5 is possible:

- award 1 mark for checking in volume
- award 1 mark for checking in surface area
- award 1 mark for valid conclusion.

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
9 (a)	**Ans: £10** • rental	• £10 1 RE
Notes:		
(b)	**Ans: 5 pence** • valid strategy • finding unit cost • appropriate answer	• cost of calls = £3 • 0·05 • 5p 3 RE

Notes:

(i) For the third mark, units must be stated.

(ii) For the third mark there must be appropriate rounding eg 22p or 21.7p.

(iii) Dividing 60 by 3 to obtain 20 can receive only the first mark.

(iv) Dividing 60 by 13 to obtain 4·6153 may receive the third mark for 4·6p or 5p.

(v) Candidates who simply find the correct gradient still may be awarded the first and second mark.

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
10 (a)	**Ans: 23°**	
	• valid strategy	• right angled triangle
	• cosine ratio	• $\cos x° = \frac{11 \cdot 5}{12 \cdot 5}$
	• processing	• 0·92
	• valid solution	• 23°
		4 RE
Notes:		
(b)	**Ans: 10·0 m**	
	• valid strategy	• $\frac{46}{360}$
	• substitution	• $\frac{x}{360} \times 25\pi$
	• evaluation	• 10·04
	• rounding	• 10·0
		4 RE

Notes:

(i) The final mark can be awarded only for an explicit rounding.

(ii) An answer of 10·0 with no working is awarded 0 marks.

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark •
11(a)	**Ans: 35·3°, 144·7°**	
	• simplifying equation	• $\sin x° = \frac{1}{\sqrt{3}}$
	• first solution	• 35·3°
	• consistent second solution	• 144·7°
		3 KU
Notes:		
(b)	**Ans: 17·6° or 72.4°**	
	• valid solution	• 17·6° **or** 72·4°
		1 RE
Notes:		

KU 22 marks
RE 25 marks

[END OF PAPER 2 MARKING INSTRUCTIONS]

FINAL TOTALS	**KU 45** **RE 45**