2012 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 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 where a number has been erroneously transcribed from the examination question is not normally penalised except where the question has been simplified as a result.

14   Where 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.

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:**	**16·69**		
	•[1]	correct calculation	•[1] 16·69	**1K**
(b)	**Ans:**	**219·6**		
	•[1]	correct multiplication	•[1] 219·6	**1K**
(c)	**Ans:**	**12·8**		
	•[1]	correct division	•[1] 12·8	**1K**
(d)	**Ans:**	$^{7}/_{12}$		
	•[1]	valid common denominator	•[1] 12	
	•[2]	completion of numerator	•[2] $^{7}/_{12}$	**2K**

NOTES:

In part (d)
(i)   for a fraction equivalent to $^{7}/_{12}$ – award 2/2

(ii)   for a final answer of 0·58(3...) – award 1/2

(iii)   for correct final answer without working – award 2/2

2	**Ans:**	**(£) $2·72 \times 10^{7}$**		
	•[1]	correct positioning of decimal point	•[1] 2·72	
	•[2]	correct power of 10 in a valid expression	•[2] $\times 10^{7}$	**2K**

NOTES:

(i)   the second mark can be awarded for a consistent power of 10, eg $27·2 \times 10^{6}$

(ii)   for correct final answer without working – award 2/2

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
3 (a)	**Ans:** 	

3 (a) **Ans:**

1	2	3	4	5		12
6	11	**16**	**21**	**26**		**61**

- •[1] any two correct number of lights
- •[2] two further correct number of lights

- •[1] any two from 16, 21, 26, 61
- •[2] remaining two from 16, 21, 26, 61

2R

(b) **Ans:** $c = 5s + 1$

•[1]•[2] correct formula

•[1]•[2] $c = 5s + 1$

2R

(c) **Ans:** **23**

- •[1] correct strategy to find s
- •[2] correct solution

- •[1] $116 = 5s + 1$
- •[2] $s = 23$

2R

NOTES:

In part (b)

(i) for an answer of (=) $5s + 1$ – award 1/2

(ii) do not penalise bad form, eg $c = 6s − (s − 1)$

(iii) a formula in words is not acceptable

(iv) for $s = 5c + 1$ – award 0/2

In part (c)

(v) the solution may be obtained from extending the table

(vi) for $116 ÷ 5 − 1$ leading to 22, 22·2, 23 – award 1/2

(vii) for $s = 5c + 1$ in part (b) leading to an answer of 581 – award 1/2

(viii) for a final answer of 23 without working – award 1/2

Question No	Give 1 mark for each •		Illustrations of evidence for awarding each mark
4 (a)	**Ans:**	**42, 56**	
	•[1]	correct multiples of 7	•[1] 42, 56 **1K**
(b)	**Ans:**	**43**	
	•[1]	correct prime number	•[1] 43 **1K**
(c)	**Ans:**	**50**	
	•[1]	the number which is closest to a square number	•[1] 50 **1K**
5	**Ans:**	**122 (º)**	
	•[1]	evidence of subtraction of a negative number	•[1] 58 − (−64)
	•[2]	correct calculation	•[2] 122 (º) **2K**

NOTES:

(i) **Final Answers**   **With Working**   **Without Working**

     122   2/2   2/2

    −122   1/2   0/2

(ii) the use of a number line from −64 to 58 is acceptable for the first mark

6	**Ans:**	**0·05 $^1/_5$ $^5/_{10}$ 0·505 51%**	
	•[1]	for any three numbers in the correct order from smallest	•[1] Three from 0·05 $^1/_5$ $^5/_{10}$ 0·505 51%
	•[2]	for further two correct leading to correct solution	•[2] **2R**

NOTES:

(i) Numbers need not be written in original form

(ii) For a final answer of 51% 0·505 $^5/_{10}$ $^1/_5$ 0·05 – award 1/2

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
7	**Ans:** **(£)120(·00)** •[1] Saturday pay •[2] Sunday pay •[3] total pay	•[1] $7 \times 7 \cdot 50 = 52 \cdot 5$ •[2] $6 \times (7 \cdot 50 + 3 \cdot 75) = 67 \cdot 5$ •[3] $52 \cdot 50 + 67 \cdot 50 = (£)120(\cdot 00)$ **3K**

NOTES:

(i)   **Alternative strategy:**

	•[1] Sunday's hours	•[1] $6 + 3 = 9$
	•[2] total hours	•[2] $9 + 7 = 16$
	•[3] total pay	•[3] $16 \times 7 \cdot 50 = (£)120(\cdot 00)$

(ii)   **Final Answer**   **With Working**   **Without Working**

        (£)120   3/3   2/3

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
8	**Ans:** **900** •[1] valid strategy •[2] correct use of valid strategy •[3] all calculations correct, must include a division	•[1] $80\% = 720$ •[2] $720 \div 8 \times 10$ •[3] 900 **3R**

NOTES:

(i)   **Final Answer**   **With Working**   **Without Working**

        900   3/3   2/3

(ii)   a valid strategy may be trial and improvement

(iii)   The third mark can be awarded for calculations leading to: 1296 (720 + 80% of 720); 864 (720 + 20% of 720); or 576 (80% of 720)

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
9	**Ans: 2326**	
	•[1] correct strategy	•[1] 0624 − 6hrs 58mins
	•[2] correct time calculation (over midnight)	•[2] 2326
		2K

NOTE:

(i)

Final Answers	**With Working**	**Without Working**
2326	2/2	2/2
1126 pm	2/2	2/2
2326 pm	2/2	2/2
1126(am)	1/2	1/2
2322 (0624 − 7h 2min)	1/2	0/2
1322 (0624 + 6h 58min)	1/2	0/2

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
10	**Ans: 161(°)**	
	•[1] identify < BCD as right angle	•[1] Angle BCD = 90°
	•[2] use properties of a triangle to find < CBD	•[2] 180° − 90° − 71° = 19°
	•[3] correct value of shaded angle <ABC	•[3] 180° − 19° = 161(°)
		3R

NOTE:

(i)

Final Answers	**With Working**	**Without Working**
161	3/3	1/3
142 (from 180 − 2 × 71)	2/3	0/3

KU 17 marks
RE 14 marks

[END OF PAPER 1 MARKING INSTRUCTIONS]

Marking Instructions

Award marks in whole numbers only

Question No	Give 1 mark for each •		Illustrations of evidence for awarding each mark	
1	**Ans:**	**9·6 (km/h)**		
	•[1]	convert time to hours	•[1] 1 hr 15 mins = 1·25 hrs	
	•[2]	correct use of formula	•[2] 12/1·25	
	•[3]	correct calculation, must involve a division	•[3] 9·6 (km/h)	**3K**

NOTE:

(i)	**Final Answers**	**With Working**	**Without Working**
	9·6	3/3	2/3
	10·4 (12 ÷ 1.15)	2/3	0/3
	0·16 (12 ÷ 75)	2/3	0/3
	0·104 (1.25 ÷ 12)	2/3	0/3
	6·25 (75 ÷ 12)	1/3	0/3
	0·104 (12 ÷ 115)	1/3	0/3

2	**Ans:**	**Diagram completed**	
	•[1]	1 line correct	
	•[2]	for a further 2 lines correct	
	•[3]	for a further 2 lines correct	**3R**

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
3	**Ans:** **(£)455**	
	•[1] finding the cost of 3 base cabinets	•[1] $3 \times 66 \ (= 198)$
	•[2] finding the cost of 2 wall cabinets	•[2] $2 \times 39 \ (= 78)$
	•[3] adding the cost of drawer cabinet to above	•[3] (£)455 **3K**

NOTE:

(i) **Final Answer**   **With Working**   **Without Working**

      455   3/3   2/3

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
4	**Ans:** **233(º)**	
	•[1] valid strategy	•[1] $270 - 37$ or $180 + 53$
	•[2] correct calculation within valid strategy	•[2] 233(º) **2R**

NOTE:

(i) **Final Answer**   **With Working**   **Without Working**

      233   2/2   2/2

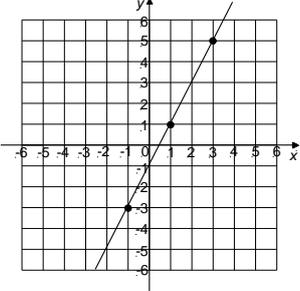| Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
5	**Ans:** **(£)264·50**	
	•[1] know to find the cost of full price boxes	•[1] 8×23 (= 184)
	•[2] find the number of ½ price boxes	•[2] 7
	•[3] know to find the cost of ½ price boxes	•[3] $7 \times ½ \times 23$ (= 80·50)
	•[4] all calculations correct within a valid strategy	•[4] $(184 + 80·50 =)$ (£)264·50 **4R**

NOTES:

(i) Alternative Strategy:

•[1] know to find the cost of 15 boxes		•[1] 15×23 (= 345)
•[2] find the number of ½ price boxes		•[2] 7
•[3] know to find the cost of ½ price boxes		•[3] $7 \times ½ \times 23$ (= 80·50)
•[4] calculations correct within a valid strategy		•[4] $(345 - 80·50 =)$ (£)264·50

(ii)

Final Answers	**With Working**	**Without Working**
264·50	4/4	2/4
264·5	3/4	1/4
299 $(9 \times 23 + 8 \times 11·50)$	3/4	0/4
230 $(7 \times 23 + 6 \times 11·50)$	3/4	0/4
258·75 $(7·5 \times 1·5 \times 23)$	2/4	0/4
517·50 $(15 \times 1·5 \times 23)$	2/4	0/4
172·50 $(15 \times 23 \times ½)$	1/4	0/4

(iii) Candidates may adopt a listing approach

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
6 (a)	**Ans:** **–3, 1, 5** •[1] one value correct •[2] a further two values correct	<table><tr><td>x</td><td>−1</td><td>1</td><td>3</td></tr><tr><td>y</td><td>**−3**</td><td>**1**</td><td>**5**</td></tr></table> **2K**
(b)	**Ans:** **line plotted** •[1] 2 points correctly plotted •[2] correct straight line drawn	 **2K**

NOTES:

In part (b)

(i) If the line $y = 2x - 1$ is correctly drawn – award 2/2

(ii) For any straight line other than $y = 2x - 1$, the 2nd mark can be awarded if the line passes through all 3 points in part (a)

Question No	Give 1 mark for each •		Illustrations of evidence for awarding each mark	
7	**Ans: 126(·5) (cm)**			
	•¹	finding length of short side	•¹	$230 - 190 (= 40)$
	•²	correct Pythagoras statement	•²	$120^2 + 40^2$
	•³	knowing to calculate square root	•³	$\sqrt{16\,000}$
	•⁴	all calculations correct, within a right angled triangle	•⁴	126(·5) (cm)
				4R

NOTE:

(i)
Final Answers	**With Working**	**Without Working**
126(·5)	4/4	2/4
113·1 $(120^2 - 40^2)$	3/4	0/4
259·4 $(230^2 + 120^2)$	3/4	0/4
224·7 $(190^2 + 120^2)$	3/4	0/4
196·2 $(230^2 - 120^2)$	2/4	0/4
147·3 $(190^2 - 120^2)$	2/4	0/4

Question No	Give 1 mark for each •		Illustrations of evidence for awarding each mark	
8	**Ans: (£)95**			
	•¹	correct subtraction of deposit	•¹	$1315 - 175 = 1140$
	•²	dividing above amount by 12	•²	$1140 \div 12$
	•³	correct calculations, minimum 2	•³	(£)95
				3R

NOTE:

(i)
Final Answers	**With Working**	**Without Working**
95	3/3	2/3
124·17 or 124·16 $((1315 + 175) \div 12)$	2/3	0/3
109·58 or 109·59 $(1315 \div 12)$	1/3	0/3

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
9 (a)	**Ans:** $x = 5$ •^{1} correct multiplication of bracket •^{2} correct gathering of number terms •^{3} correct solution	•^{1} $12x - 18$ •^{2} $42 + 18 = 60$ •^{3} $x = 5$ **3K**
(b)	**Ans:** $3(4t + 3u)$ •^{1} correct factor •^{2} correct factorisation	•^{1} $3(\ )$ or $(4t + 3u)$ •^{2} $3(4t + 3u)$ **2K**

NOTE:

(i) In part (a) for $x = 5$ without algebraic working – award 0/3

10	**Ans: Yes, the mean time of the 2nd semi-final was 0·01s less than the 1st** •^{1} correct addition of 2nd semi-final times •^{2} knowing to divide answer to above by 8 •^{3} correct division •^{4} correct response and reason	•^{1} $(10{\cdot}21 + 10{\cdot}04 + 9{\cdot}92 + ...) = 79{\cdot}76$ •^{2} $(79{\cdot}76) \div 8$ •^{3} $9{\cdot}97$ •^{4} Yes, the mean time of the 2nd semi-final was 0·01s less than the 1st **4R**

NOTES:

(i) The reason must include 0·01, 9·97 or 9·98 and comparative language. Eg the second semi-final was 9·97s which is quicker.

(ii) For the final mark a numerical comparison between mean and mode or mean and median may be acceptable.

Question No	Give 1 mark for each •		Illustrations of evidence for awarding each mark
11	**Ans:**	**Correct bar chart drawn**	
	•^{1}	suitable scale on y-axis	
	•^{2}	bars correctly labelled and equal width	
	•^{3}	one bar correct	
	•^{4}	three further bars correct	**4K**

NOTES:

(i)   A graph without spaces is acceptable.

(ii)   Candidates who draw a line graph may obtain the first mark.

12	**Ans:**	**7 (cm)**		
	•^{1}	knowing to use 2 gaps	•^{1}	$2 \times 1 \cdot 5 \, (= 3)$
	•^{2}	knowing to subtract the gaps from the length	•^{2}	$45 - 3 \, (= 42)$
	•^{3}	correct calculation	•^{3}	$42 \div 6 = 7 (cm)$
				3R

NOTE:

(i)	**Final Answers**	**With Working**	**Without Working**
	7	3/3	2/3
	14	2/3	0/3
	6·75	2/3	0/3
	6	2/3	0/3
	7·5	1/3	0/3

Question No	Give 1 mark for each •		Illustrations of evidence for awarding each mark	
13	**Ans:**	**25·6 (m)**		
	•[1]	correct trig statement	•[1]	$\text{Tan } 52° = h/20$
	•[2]	rearrange formula	•[2]	$h = 20 \times \text{Tan } 52°$
	•[3]	correct calculation	•[3]	$h = 25·598...$
	•[4]	correct rounding	•[4]	$h = 25·6 \text{ (m)}$
				4K

NOTE:

(i)

Final Answers	**With Working**	**Without Working**
25·6	4/4	3/4
(-)121·1 [RAD]	4/4	3/4
21·3 [GRAD]	4/4	3/4
15·8 (20 × Sin 52°)	3/4	0/4
12·3 (20 × Cos 52°)	3/4	0/4

Question No	Give 1 mark for each •		Illustrations of evidence for awarding each mark
14	**Ans:**	**7·97 (cm)**	
	•[1]	knowing to find the area of round label	•[1] $\pi \times 4\cdot5^2$
	•[2]	knowing to find length of side of square label	•[2] $\sqrt{63\cdot585}$
	•[3]	both calculations correct , one must involve π	•[3] 7·97 (cm)
			3R

NOTES:

(i)

Final Answers	**With Working**	**Without Working**
7·98	3/3	2/3
8	3/3	2/3
15·9 (63·6 ÷ 4)	2/3	0/3
7·1 (28·3 ÷ 4)	2/3	0/3
5·3 ($\sqrt{28\cdot3}$)	2/3	0/3

(ii)   The third mark is only available to candidates who calculate a length of side from an area/circumference.

KU 23 marks
RE 26 marks

[END OF PAPER 2 MARKING INSTRUCTIONS]

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