

# Mark Scheme (Results)

November 2011

Applications of Mathematics (GCSE)  
Unit 2: 5AM2F\_01 (Foundation)

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## NOTES ON MARKING PRINCIPLES

- 1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- 2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- 3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- 4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- 5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- 6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:
  - i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*  
Comprehension and meaning is clear by using correct notation and labeling conventions.
  - ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*  
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.
  - iii) *organise information clearly and coherently, using specialist vocabulary when appropriate.*  
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

**7 With working**

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

**8 Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**9 Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**10 Probability**

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**11 Linear equations**

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

**12 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

**13 Range of answers**

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

**Guidance on the use of codes within this mark scheme**

M1 – method mark  
A1 – accuracy mark  
B1 – Working mark  
C1 – communication mark  
QWC – quality of written communication  
oe – or equivalent  
cao – correct answer only  
ft – follow through  
sc – special case  
dep – dependent (on a previous mark or conclusion)  
indep – independent  
isw – ignore subsequent working

5AM2F_01					
Question		Working	Answer	Mark	Notes
1	(a)		400 or 4 hundred	1	B1
	(b)		6 hundredths or $\frac{6}{100}$	1	B1 (SC B1 accept 60g)
	(c)	5.46 – 5 Or 5460 – 5000		2	M1 for conversion 5kg = 5000g or 5460g = 5.46kg or digits 460 seen A1 460g or 0.46kg units needed.
2			Accept 31 to 36	2	B2 for answer in range 33 – 38 inclusive (B1 for answer in range 31 – 40 where B2 not awarded)
3		85 – 28 + 37 = 93 120 – 93  120 – 85 = 35    35 – (37 – 29) 35 – 8	27	3	M1 for first stage 85 – 29 or 85 + 37 or 37 – 29 or 120 – 85  M1 complete method 120 – "93" oe A1 cao

5AM2F_01				
Question	Working	Answer	Mark	Notes
4	$3 \times 6 = 18$ $100 - 18 = 82$ $5 \times 8 = 40$ $3 \times 14 = 42$	5, 3	4	<p>M1 finding 18 cm already used or <math>100 - 18</math> or <math>100 - 3 \times 6</math></p> <p>M1 for finding at least a multiple of 8 cm and 14 cm or adding at least three 14's and 6's</p> <p>M1 for finding totals and comparing with 82 or 100 if 18 totalled as well</p> <p>A1 for 5 and 3</p> <p>OR</p> <p>M1 finding 18 cm already used, or deducting from total (eg using 82 cm)</p> <p>M1 for deducting total length of 8 cm and 14 cm lengths of string from 100</p> <p>M1 for finding length remaining each time , at least three deductions of 8 or 14</p> <p>A1 for 5 and 3</p> <p>(SC B2 only 5 or 3 on the answer line)</p>
5	$4 + 3 + 3 = 10$ $33 + 42 + 6 = 81$ $81 - 60 = 21$ $10 + 1 = 11$  or $4:33 = 273$ secs $3:42 = 222$ secs $3:06 = 186$ secs $273 + 222 + 186 = 684$ $15:00 - 11:21$ or $900 - 684$	3 minutes 39 seconds	4	<p>M1 for attempting to add minutes or seconds or 684 or 1081 or 1121 seen</p> <p>M1 for a conversion at any stage using 60 (indep) eg <math>4 \times 60 + 33</math>, or 10 minutes 81 seconds or <math>81 \div 60</math></p> <p>M1 for attempting to subtract "total time" from 15 minutes <math>1500 - 1121</math> or <math>15.00 - 1081</math> or <math>900 - 684</math></p> <p>A1 cao.</p>

5AM2F_01				
Question	Working	Answer	Mark	Notes
6	(a)		1	B1 for X at 0 (+5mm)
	(b)		1	B1 for X at $\frac{2}{5}$ within guidelines ( $>\frac{1}{4}$ , $<\frac{1}{2}$ )
7	(a)	$8 \times 30 + 20$	2	M1 for $8 \times 30 + 20$ A1 cao
	(b)	$34 \times 8 = 272$ $300 - 272$ Or $34 \times 8 + b = 300$ $272 + b = 300$ $b = 300 - 272$	3	M1 for $34 \times 8$ or 272 or forming equation M1 dep for $300 - "272"$ A1 cao  M1 $300 = 34 \times 8 + b$ M1 $300 - "34 \times 8" = b$ A1 cao
8	(a)	$1.65 + 0.80$	2	M1 for $1.65 + 0.80$ or digits 245 seen A1 for 2.45 condone £2.45p
	(b)	$1.40 + 1.40 + 0.75 + 0.80$ $= 4.35$ $4.35 < 5.00$ or $5.00 - 4.35 = 0.65$  or rounded values used eg $1.50 + 1.50 + 1 + 1 = 5$ All rounded up so enough money	3	M1 for $1.40 + 1.40 + 0.75 + 0.80$ or 435 digits seen A1 for 4.35 or digits 65 C1 (dep on M1) based on their 4.35 Or M1 for addition of appropriately rounded prices A1 for correct total of rounded prices. C1 (dep on M1) Decision given – he has enough money

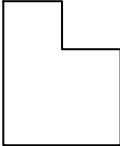
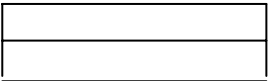


5AM2F_01				
Question	Working	Answer	Mark	Notes
9	$26 \div 3 = 8 \times 2 \times 38$ remainder 2 $8 \times 90 + 238 = 796$	£7.96 or 796p	5	M1 for attempting to add carton prices or $26 \div 3$ M1 $26 \times 38$ or 988 seen M1 for “8” $\times 90 +$ “2” $\times 38$ A1 £7.96 or 796p C1 ft (dep on M1) “£7.96” is the least they can spend
10		(S,A) (S,C) (S,F) (A,C) (A,F) (C,F)	2	M1 for any 3 different combinations ignore repeats and condone one incorrect extra A1 for all 6 (ignore repeats)
11	(a) $12 \times 0.45$	5.40	2	M1 for $12 \times 45$ or $12 \times 0.45$ or digits 54(0) or 5.4 seen A1 cao
	(b) $6 \div 8 \times 5$	3.75	2	M1 for $6 \div 8$ or $6 \times 5$ or digits 375 seen or 0.75 or 30 A1 cao
12	$n + n + 6 + n + n + 6$	$P = 4n + 12$	2	M1 $n + n + 6 + n + n + 6$ or $4n + 12$ oe or $P = 6n \pm k$ A1 for $P = 4n + 12$ oe
13	$180 - 60 = 120$ $180 - 120 - 35 = 25$ Or $60 - 35 = 25$	$25^\circ$	3	B1 for 60 or 120 M1 for $180 - (2 \times 60) - 35$ A1 for $25^\circ$ Or B1 for 60 M1 for $180 - (180 - 60) - 35$ A1 for $25^\circ$
14	$200 \times 17.5 = 3500$ Or $2828 \div 17.5 = 161.6$	162 Annual ticket is cheaper	3	M1 for $200 \times 17.5$ or $2828 \div 17.5$ or 1616 digits seen A1 for 3500 or 161.6 or 161 seen C1 ft (dep M1) For conclusion that an annual ticket is cheaper.

5AM2F_01					
Question		Working	Answer	Mark	Notes
15	(a)		69	1	B1 for $(0)69^\circ \pm 2^\circ$
	(b)		Point marked	2	B2 inside overlay lines (B1 for correct bearing $125^\circ$ within guidelines ( $\pm 2^\circ$ )) B1 for correct length 6mm within guidelines ( $\pm 2\text{mm}$ ))
16	(a)		Correct net drawn	3	B3 for any correct complete net or outline of a correct net (B2 for 4 correct adjacent rectangles or correct net wrong scale) (B1 for one rectangle of correct dimensions but not part of a 3D diagram)
	(b)	$(8 \div 2) \times (20 \div 4) \times (12 \div 6)$ or $(8 \div 4) \times (20 \div 2) \times (12 \div 6)$ or $(8 \times 12 \times 20) \div (6 \times 4 \times 2)$	40	3	M1 for $8 \div 2$ or $20 \div 4$ or $12 \div 6$ or $8 \div 4$ or $20 \div 10$ or clearly marked on diagram M1 for "4" $\times$ "5" $\times$ "2" or "10" $\times$ "2" $\times$ "2" A1 cao Alternative: M1 for $8 \times 12 \times 20$ or $6 \times 4 \times 2$ M1 for "1920" $\div$ "48" A1 cao
17	(a)	$78 \div 1.5$	52	2	M1 for $78 \div 1.5$ or $78 \div 1\frac{1}{2}$ or digits 52 A1 for 52 cao
	(b)	$78 \times 2 \div 40$ or $80 \times 2 \div 40$ (estimate)	3.9 (or 4)	2	M1 for $78 \times 2 \div 40$ or $78 \div 40 \times 2$ or $80 \times 2 \div 40$ A1 for 3.9 or 4 (SC B1 for 2 on answer line)

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Question		Working	Answer	Mark	Notes
18	(a)	$73 + 109 + 66 = 248$ $360 - 248 = 112$	112	2	M1 for $360 - (73 + 109 + 66)$ A1 for 112 cao
	(b)	$109 + 73 \neq 180$ or $66 + 112 \neq 180$  $180 - 109 \neq 73$ $180 - 73 \neq 109$ $180 - 66 \neq 112$ $180 - 112 \neq 66$	No with reasoning given	2	M1 for “x”+ 66 or $73 + 109$ A1 for stating that the total of the co-interior angles is not 180  OR  M1 for stating an appropriate pair of alternate angles 71, 107, 114 or 68(ft from (a)) A1 for stating that alternate angles are not equal
19	(a)	$1 - 0.03$	0.97	2	M1 for $1 - 0.03$ A1 for 0.97 oe
	(b)	$0.03 \times 1200$	36	2	M1 for $0.03 \times 1200$ A1 for 36 cao

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Question		Working	Answer	Mark	Notes
20	(a)(i)	60 miles $\approx$ 96 km or 100 km $\approx$ 62 miles	32	2	B1 cao
	(ii)		30		B1 cao
	(b)		Henri with reason give	2	M1 for correct conversion method or 96km or 62 miles A1 for Henri (travels furthest)
21	(a)		Circle	1	B1 for circle drawn within guidelines
	(b)		Triangle	2	M1 for constructing intersecting arcs of equal radius A1 for a correct triangle within guidelines, with appropriate arcs (SC B1 for a triangle drawn within guidelines if M0)
22	(a)(i)	16 + 16	5	2	B1 cao
	(ii)		15		B1 cao
	(b)		4 (pm)	1	B1 cao
	(c)		32	2	M1 for 16 seen A1 for 32 cao
23			Correct region shaded	3	B1 for perpendicular bisector within guidelines B1 for arc of circle within guidelines B1 for correct region shaded or otherwise indicated

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Question	Working	Answer	Mark	Notes
24	(a) $\pi \times 4.5^2$	63.6	2	M1 for $\pi \times 4.5^2$ A1 for 63.5 – 63.7
	(b) $1000 \div 4$	250	4	M1 for $1000 \div 4$ or 250 or 750 seen
	$1000 - 250 = 750$	300		M1 for $(1000 - 250) \div (2 + 3)$ oe or $\frac{2}{5}$ or $\frac{3}{5}$ oe or 150 seen
	$\frac{750}{(2 + 3)} \times 2$	450		
	$\frac{750}{(2 + 3)} \times 3$			M1 (dep) for '150' $\times 2$ or '150' $\times 3$ or $\frac{2}{5} \times 750$ or $\frac{3}{5} \times 750$ A1 for 250, 300 and 450 in correct places (SC: B2 for 250, 450, 300, i.e. tulips and hyacinths transposed)
25	(a)	Correct elevation 	2	B2 for correct elevation in correct orientation (B1 for incorrect orientation)
	(b)	Correct plan 	2	B2 for correct plan with internal line shown (B1 for internal line missing or for rectangle with one wrong dimension)

5AM2F_01					
Question		Working	Answer	Mark	Notes
26	(a)	$23 \times 50 \div 100$	11.5	2	M1 for $23 \times 50$ or 1150 seen or $0.23 \times 50$ or $23 \times 0.5$ A1 cao
	(b)	$2.4 \div 50 \times 100$	4.8	2	M1 for $2.4 \div 50$ or 0.048 seen or $240 \div 50$ or $2.4 \div 0.5$ A1 cao
27		$30 \times 5 - 4.9 \times 5^2$	27.5	2	M1 for $30 \times 5$ and $4.9 \times 5^2$ or 150 and 122.5 A1 cao



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