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Mark Scheme (Results)

January 2017

International GCSE Mathematics A
4MA0/2F

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- 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.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- **Types of mark**
    - M marks: method marks
    - A marks: accuracy marks
    - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
    - cao – correct answer only
    - ft – follow through
    - isw – ignore subsequent working
    - SC - special case
    - oe – or equivalent (and appropriate)
    - dep – dependent
    - indep – independent
    - awrt – answer which rounds to
    - eeoo – each error or omission

- **No working**
  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.
- **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 it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.
  Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.
  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 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.
  If there is no answer on the answer line then check the working for an obvious answer.
- **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: eg. Incorrect cancelling 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 eg algebra.
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.
- **Parts of questions**
  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

International GCSE Maths January 2017 – Paper 2F Mark scheme

Apart from Question 20, where the mark scheme states otherwise, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

Q		Working	Answer	Mark	Notes
1	(a)		35079	1	B1
	(b)		700	1	B1 or (seven) hundreds
	(c)		1, 2, 5, 7, 10, 14, 35, 70	2	B2 Award B1 for any four correct factors.
	(d)	$9113 - 738$		2	M1 for using 9113 and 738
			8375		A1 cao
					Total 6 marks

2	(a)		6.5	1	B1 Allow 6.3 to 6.7
	(b)		35	1	B1 Allow 33 to 37
	(c)		right (angle)	1	B1
					Total 3 marks

3	(a) (i)		(5, 1)	1	B1
	(ii)		$(3, -1)$	1	B1
	(b)		$D(3, 3)$ marked	1	B1 Condone omission of D if unambiguous.
	(c)			2	M1 For $\frac{2}{4}$ or $\frac{1}{2}$ oe or a clear attempt to work out $\frac{\text{distance up}}{\text{distance along}}$ for AB (condone omission of negative sign)
			$-\frac{1}{2}$		A1 oe
					Total 5 marks

4	(a)		any parallelogram drawn	1	B1	Accept a square, rectangle or a rhombus
	(b)		pentagon	1	B1	
	(c) (i)		pyramid	1	B1	
	(ii)		8	1	B1	
						Total 4 marks

5	(a)		$\frac{8}{24}$	1	B1	oe Eg, $\frac{4}{12}, \frac{2}{6}, \frac{1}{3}$
	(b)		any three squares shaded	1	B1	
	(c)	Eg $\frac{30}{100} \times 185$ or 0.3×185 or 18.5×3		2	M1	For a complete method If M1 not awarded then SCB1 for 129.5
			55.5		A1	
						Total 4 marks

6 (a)	Square width 6 with hole width 4.	correct shape drawn	1	B1	
(b)		20, 24	1	B1	
(c)	Eg $11\times11-9\times9$ or $9\times4+4$ or $24+4\times4$ or (8, 12, 16, 20, 24), 28, 32, 36, 40		2	M1	For a complete method or For a sequence continued to at least the ninth term, following through a single arithmetical error or For $4n+4$
		40		A1	
(d)		10	1	B1	
(e)		$W=n+2$	2	B2	oe B1 for $n+2$ or $n=W-2$
					Total 7 marks

7 (a) (i)		$(2+4)\times6-3$	2	B1	
(ii)		$2+4\times(6-3)$		B1	
(b)	Eg $\frac{16}{2}-\frac{18}{3}$ or $8-6$ or $\frac{48}{6}$ or $\frac{12}{6}$		2	M1	For a complete method
		2		A1	cao
					Total 4 marks

8	(a)		45 000	1	B1	
	(b)		France	1	B1	
	(c)	height 28 000	correct bar drawn	1	B1	any width
	(d)	$155-26$		2	M1	For $155-26$
			129		A1	
	(e)	$\frac{45+1}{2}$ or 23 or $\frac{45}{2}$ or 22.5		2	M1	For an ordered list at least as far as the first 2
			2		A1	
						Total 7 marks

9	(a) (i)		69	2	B1	allow -69
	(ii)		98		B1	allow -98
	(b)		-235	1	B1	
	(c)	Eg $\frac{458+14-55-153-214}{5}$ or $\frac{50}{5}$		2	M1	For a complete method
			10		A1	
						Total 5 marks

10	(a)	12×12.19		2	M1	accept 12 or 12.2 or 12.19 multiplied by a value in the range 9 to 15
			146		A1	accept 108 to 183
	(b)	$6.2\times2.4\times2.5$		2	M1	
			37.2		A1	
						Total 4 marks

11	(a)		6	1	B1	
	(b)		triangle drawn $(-2,2),(6,2),(0,-4)$	2	B2	B1 for any translation of the correct enlarged triangle or an enlargement with the correct centre but wrong SF (for SF≠1)
	(c)			2	M1	For clearly identifying the line $x = 1$ or For a reflection in any vertical line
			triangle drawn $(-3,0)$ $(-1,-3)$, $(-3,-2)$		A1	SCB1 for a correct reflection in $y = 1$
						Total 5 marks

12	Eg $\frac{715.5}{530}\times 750$ or 1.35×750 oe Or $\frac{750}{530}\times 715.5$ or $1.41(509...)\times 715.5$ oe Or $750\div\frac{530}{715.5}$ or $715.5\div\frac{530}{750}$ oe		3	M2	For a complete method If not M2 then M1 for $\frac{715.5}{530}$ or 1.35 oe or $\frac{530}{715.5}$ or 0.740(740…) oe or $\frac{750}{530}$ or 1.41(509...) oe $\frac{530}{750}$ or 0.706(666…) oe $530x = 750\times 715.5$
		1012.50		A1	Accept 1012.5
					Total 3 marks

13	(a)		$6x^2$	1	B1	
	(b)	Eg $2\times12-5\times3$ or $24-15$		2	M1	For a correct substitution
			9		A1	
	(c)	Eg $8=2f-5\times-6$ or $8=2f--30$ or $8=2f+30$ or $2f=8+5\times-6$ or $2f=-22$		3	M1	For a correct substitution or $f=\frac{e+5g}{2}$
		$(f=)\frac{8-30}{2}$ or $\frac{-22}{2}$ or $\frac{8+5\times-6}{2}$			M1	
			-11		A1	SCB2 for -11 embedded
						Total 6 marks

14	(a)	Eg $\frac{137}{360}\times100$ or $137\div3.6$		2	M1	For a complete method
			38.1		A1	Accept 38 – 38.1
	(b)	$\frac{5}{100}\times360$ or 0.05×360 or $\frac{360}{100}\times5$ or $\frac{137}{"38.0(\ldots)"}\times5$		2	M1	For a complete method Ft their answer to part (a)
			18		A1	Ft their answer to part (a) rounded or truncated to at least 3SF
						Total 4 marks

15	(a) (i)		9.746794345	2	B1	Allow 9.7467(94345…) rounded or truncated to at least 5SF
	(ii)		9.75		B1	ft if at least 3DP given in (i)
	(b) (i)	$\frac{256}{36-\pi}$ or $\frac{256}{32.8(584...)}$		3	M1	For 32.8(58...) rounded or truncated to at least 3SF seen
			7.791004515		A1	Allow 7.791(0045...) rounded or truncated to at least 4SF
	(ii)		7.79		B1	ft if at least 4SF given in (i)
						Total 5 marks

16 (a) (i)			$\frac{3}{7}$	1	B1
(ii)			$\frac{9}{5}$	1	B1
(b)			35	1	B1
					Total 3 marks

17 (a)	a, b, d, e		a, b, d, e	2	B2 B1 for a, e **or** a, b, d **or** b, d, e **or** a, b, e **or** a, d, e **or** a, b, c, d, e **or** a, b, d, e, f or a Venn diagram with a, c, e, f correctly shown
(b)			c, e, f	1	B1
					Total 3 marks

18 (a)	$1-0.4-0.2-0.1$ or 0.3			3	M1
	$\frac{1-0.4-0.2-0.1}{2}$ or $\frac{"0.3"}{2}$				M1 dep
			0.15		A1
(b)	200×0.4			2	M1
			80		A1 Note: Award M1A1 for 80 out of 200 Award M1A0 for 80/200
					Total 5 marks

19	(a)			2	M1	For a point marked due south of *A* or on a correct bearing (within overlay) from *B*.
			Correct point		A1	within overlay
	(b)	168 + 180 or $360-12$		2	M1	For a complete method or for clearly identifying the reflex angle on the diagram.
			348		A1	cao
	(c)		6.25	1	B1	cao
						Total 5 marks

20	Eg $8y--2y=18-33$ or $10y=-15$ or $-2y-8y=33-18$ or $-10y=15$ or $25x=150$ or $5x+4(5x-33)=18$ or $33+2y+8y=18$ or $18-8y-2y=33$		3	M1	For a correct method to find an equation in x or y. Allow one arithmetical error.
	Eg $5\times 6-2y=33$ or $5\times 6+8y=18$ or $5x-2\times -1.5=33$ or $5x+8\times -1.5=18$			M1	For a correct substitution Dep on first M1awarded
		$x=6$, $y=-1.5$		A1	oe dep on M1
					Total 3 marks

21	(a)		straight line from $(12\,30, 3.5)$ to $(1315, 0)$	2	B2	B1 for a single straight line with negative gradient that starts at $(12\,30, 3.5)$ or ends at $(1315, 0)$ Ignore lines before 12:30
	(b)		1	1	B1	Ft if B1 scored in (a)
						Total 3 marks

22 (a)	$(EF^2 =)2.1^2 + 3.5^2 (= 4.41 + 12.25 = 16.66)$		3	M1	
	$(EF =)\sqrt{2.1^2 + 3.5^2}$ or $\sqrt{16.66}$			M1	dep
		4.1		A1	allow 4.08(166…) rounded or truncated to at least 2DP
(b)	$\tan F = \frac{2.1}{3.5}$ or $\tan F = 0.6$ $\sin F = \frac{2.1}{4.1}$ or $\sin F = 0.512(195...)$ $\cos F = \frac{3.5}{4.1}$ or $\cos F = 0.853(658...)$		3	M1	ft 4.1 from (a)
	$\tan^{-1}\left(\frac{2.1}{3.5}\right)$ or $\tan^{-1} 0.6$ or $\sin^{-1}\left(\frac{2.1}{4.1}\right)$ or $\sin^{-1} 0.512(195\ldots)$ or $\cos^{-1}\left(\frac{3.5}{4.1}\right)$ or $\cos^{-1} 0.853(658\ldots)$			M1	ft 4.1 from (a)
		31		A1	ft 4.1 from (a) Accept 30.8 – 31.4
					Total 6 marks

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