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Mark Scheme (Results)

Summer 2015

Pearson Edexcel International GCSE Mathematics A (4MA0) Paper 2FR

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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
  - eeoo – each error or omission
  - awrt –answer which rounds to

- **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.

For all questions, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.	(a)		$\frac{3}{100}$	1	B1 (three) hundredth(s) 0.03
	(b)		57	1	B1
	(c) (i)		3.004	2	B1
	(c) (ii)		3.2		B1
	(d)		30.8	1	B1
					Total 5 marks

2.	(a)		$\frac{3}{7}$	1	B1
	(b)		8	1	B1
	(c)		0.8	1	B1
	(d)		$\frac{12}{52}$	1	B1
					Total 4 marks

3.	(a)		tangent at *B*	1	B1
	(b)		any reflex angle marked	1	B1
	(c)		radius	1	B1
	(d)		segment shaded	1	B1
					Total 4 marks

4.	(a)	Attempt to show tallies (correct for at least one of the scores).		2	M1	Accept any correct frequency.
			4, 5, 2, 3, 3, 3		A1	
	(b)		2	1	B1	ft their table dep on M1 in (a) and a single mode.
	(c)		5	1	B1	
	(d)		Unlikely	1	B1	
						Total 5 marks

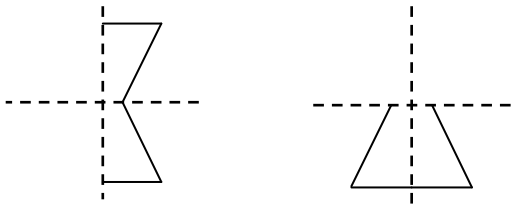
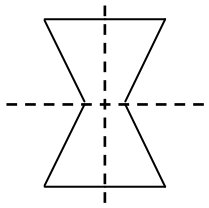
5.	(a)		isosceles	1	B1	
	(b)		**A**, **E**	1	B1	
	(c)(i)		correct cross	1	B1	cross at middle of line joining bottom corner of **B** to top corner of **D**.
	(c) (ii)		180	1	B1	
						Total 4 marks

6.	(a) (i)		67	2	B1	Accept numbers written in circles unless contradicted on the answer lines.
	(a) (ii)		43		B1	
	(b)		subtract 8	1	B1	oe Allow -8 or $107-8n$
	(c)		-5	1	B1	
	(d)		8	1	B1	
	(e)		368	1	B1	cao
						Total 6 marks

7.	(a)	$\frac{40}{100}$		2	M1	for any correct fraction
			$\frac{2}{5}$		A1	
	(b)		60	1	B1	
	(c)	70 : 42		2	M1	
			1 : 0.6		A1	Accept 0.6, $(1 :)\frac{3}{5}$, $(1 :)\frac{6}{10}$
						Total 5 marks

8.	(a)		She should have multiplied 9×3 before adding 4	1	B1	Any reason that indicates the order of operations was wrong. Accept $4+27$ but not just 31 Accept "she forgot the brackets around 4 + 9" oe.
	(b) (i)		$4-3=1$	2	B1	
	(b) (ii)		$45\div9=5$		B1	
						Total 3 marks

9.	$\frac{8+3+1+7+6+5}{6}$ or $\frac{30}{6}$		2	M1	
		5		A1	
					Total 2 marks

10.			2	M1	Reflection in either line of symmetry. Ignore other lines.
				A1	With no other lines.
					Total 2 marks

11. (i)		{i, a}	2	B1	Brackets and commas not needed. Do not allow repetitions.
(ii)		{c, h, i, n, a, t, l, y}		B1	
					Total 2 marks

12.	(a)		15 55	1	B1		Accept any separator or a space between hours and minutes.
	(b) (i)		4.50 pm	3	B1	Allow 10 minutes to 5 pm or 50 minutes past 4 pm	
	(b) (ii)	10 min + 2 hr + 12 min or 18 hr 72 min − 16 hr 50 min or 3 hr − (50 − 12) min			M1	An attempt to find difference between 1650 and 1912 that demonstrates 60 minutes in an hour.	
			2 hour 22 minutes		A1		
	(c)		2159	1	B1	Accept 9.59 pm oe	
	(d)	$\frac{638}{2.75}$ or $\frac{638}{2\frac{3}{4}}$ or $\frac{638}{11/4}$ or $\frac{638}{11}\times 4$ or $\frac{638}{165}\times 60$ oe		3	M2	M1 for 638 ÷ 2.45 or 260(.408....) rounded or truncated to 3 or more significant figures or 638 ÷ 165 or 3.86(6666...) rounded or truncated to 3 or more significant figures	
			232		A1	cao	
							Total 8 marks

13.	Line from *P* at 60^o to base (2^o tolerance) or arc from *Q* of length 7.3 cm (2 mm tolerance)		2	M1	
		correct triangle		A1	
					Total 2 marks

14.	(a)		$\frac{5}{12}$	1	B1	Accept 0.41, 0.42, 0.41(6666…)
	(b)		$\frac{4}{12}$	1	B1	Accept 0.33(333…), $\frac{1}{3}$
	(c)	$1-\frac{19}{36}$		2	M1	
			$\frac{17}{36}$		A1	Accept 0.47(222…)
						Total 4 marks

15.	(a)		196	1	B1	Accept 14^2
	(b)		343	1	B1	Accept 7^3
	(c)		97	1	B1	
	(d)		3^4	1	B1	
	(e) (i)		3.2710	2	B1	Accept 3.2710(6631…), 3.2711
	(e) (ii)		3.3		B1	ft from (i) if at least 3 figures shown
						Total 6 marks

16.	(a)		8	1	B1	
	(b)	$8y=-12$ or $-8y=12$		2	M1	
			$-1\frac{1}{2}$		A1	Accept $-\frac{12}{8}$, $-\frac{6}{4}$, $-\frac{3}{2}$, -1.5
						Total 3 marks

17.	$\frac{4+9+7+1+6+3}{2}$ or $\frac{(4+9+7+1+6+3)+1}{2}$ or $\frac{30}{2}$ or $\frac{31}{2}$ or 15 or $15\frac{1}{2}$		2	M1 Condone 1 omission Eg $\frac{9+7+1+6+3}{2}$ Accept a clear intention to list the numbers in order and find the centre of the list.
		2		A1
				Total 2 marks

18.	(a) (i)		correct line	1	B1	Parallel to y-axis through $x = 2$	Lines must pass through at least two correct grid intersections.
	(a) (ii)		correct line	1	B1	Parallel to x-axis through $y = 3$	
	(a) (iii)	$(-2,-4), (-1,-1), (0,2), (1,5), (2,8), (3,11)$	correct line drawn from between $x = -2$ and $x = 3$	3	B3	For a correct line between $x = -2$ and $x = 3$. If not B3, then B2 for: • at least 2 correct points plotted or • for a line passing through at least 2 correct points or • for a line drawn with positive gradient through (0,2) and clear intention to use a gradient of 3 (e.g. a line through (0,2) and (0.5, 5) If not B2, then B1 for: • at least 2 correct points stated (may be in a table) or • for a line drawn with a positive gradient through (0 , 2) or • for a line with gradient 3.	

(b)			2	M1	ft for a point marked above their $y = 3x + 2$ if at least B1 scored in (a) or for a point to the right of $x = 2$
		correct point		A1	Point marked above $y = 3x + 2$ and to the right of $x = 2$ (not on lines). Label *P* may be omitted if unambiguous. SCB1 for the correct region identified by either shading in or shading out.
					Total 7 marks

19. (a)	Eg $\frac{7\frac{1}{2}}{100}\times 15000$ or 0.075×15000 oe or 1125 or $0.075 \times 15000 + 15000$ or 15000×1.075 oe		2	M1	For finding 7.5% of 15000 or for a complete method to increase 15000 by 7.5% (eg 1.075×15000)
		16125		A1	cao
(b)	Eg $\frac{1800}{8} \times 108$ or $\frac{1800}{0.08} \times 1.08$ or 22500×1.08 or $\frac{1800}{0.08} + 1800$ or $\frac{1800}{8} \times 100 + 1800$ or $225 \times 100 + 1800$ or $22500 + 1800$		3	M2	For a complete method M1 for $8\% = 1800$ or $0.08x = 1800$ or $\frac{1800}{8}$ or 225 or $\frac{1800}{0.08}$ or 22500 or $\frac{x}{1800} = \frac{108}{8}$ oe
		24300		A1	
					Total 5 marks

20.	$\cos 56^\circ = \frac{7.4}{x}$ or $7.4 = x\cos 56$ or $\sin(90 - 56) = \frac{7.4}{x}$ or $7.4 = x\sin(90 - 56)$		3	M1	Correct equation for x. e.g. $x^2 = 7.4^2 + (7.4\tan 56^\circ)^2$
	($x =$) $\frac{7.4}{\cos 56}$ or $\frac{7.4}{\sin(90-56)}$			M1	Correct expression for x. e.g. $x = \sqrt{7.4^2 + (7.4\tan 56^\circ)^2}$
		13.2		A1	awrt 13.2
					Total 3 marks

21.	(a)	$\frac{175}{7}\times 9$		2	M1	For a complete method
			225		A1	
	(b)	$\frac{400}{27+14+9}\times 27$ oe or $\frac{400}{27+14+9}$ or $\frac{400}{50}$ or 8		2	M1	
			216		A1	
						Total 4 marks

22.	(a)		$10p-15$	1	B1	Accept $10\times p-15$
	(b)	$n^2+8n-5n-40$		2	M1	Three correct terms (out of four) or four terms correct except for signs.
			$n^2+3n-40$		A1	Do not isw.
	(c)	$6=(-2)^3-k(-2)+5$ or $6 = -8 + 2k + 5$		3	M1	For correct substitution Allow omission of brackets..
		Eg $6+8-5=2k$ or $-2k=-8+5-6$ or $9 = 2k$ or $-9 = -2k$ or $k=\frac{(-2)^3-6+5}{-2}$ or $-k=\frac{6-(-2)^3-5}{-2}$ or $-k = -4.5$			M1	For correctly isolating $2k$ or $-2k$ or k or $-k$ in a correct equation.
			4.5		A1	Accept $4\frac{1}{2}, \frac{9}{2}$
						Total 6 marks

23. (a)	$1-0.44-0.42-0.04$		2	M1	
		0.1 oe		A1	Accept $\frac{1}{10}$ oe or 10 %
(b)		0.86 oe	1	B1	Accept $\frac{86}{100}$ or $\frac{43}{50}$ oe or 86 %
(c)	1200×0.04		2	M1	
		48		A1	Accept 48 out of 1200 Note: M1A0 for 48/1200
					Total 5 marks

24.	$2\pi\times3.5\times8.2+2\pi\times3.5^2$ or $57.4\pi+24.5\pi$ or 81.9π or $180(.327..)+76.9(690...)$ or $2\pi\times3.5\times8.2+\pi\times3.5^2$ or $180(.327..)+38.4(845...)$ or $218(.81....)$		3	M2	Allow 76.9(690...), 180(.327...), 38.4(845...) and 218(.81...) if rounded or truncated to at least 3 significant figures. M1 for $2\times\pi\times3.5\times8.2$ or 57.4π or 180(.3274…) or $2\times\pi\times3.5^2$ or 24.5π or 77 or 76.9(690…)
		257		A1	awrt 257
					Total 3 marks

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