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Mark Scheme (Results)

June 2016

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

- **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.

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Apart from question 17b (where the mark scheme states otherwise) the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method

Ques		Working	Answer	Mark	Notes
1	ai		(3, 4)	1	B1
	aii		(-5,1)	1	B1
	b	$5 \times 3 + 3 + 0.5 + 0.5 + 0.5$ or $5 \times 3 + 0.5 \times 3 \times 3$ oe	 19.5	2	M1 A1
					Total 4 marks

2	a		18	1	B1
	b		40	1	B1
	c		10 squares shaded	1	B1
					Total 3 marks

3	a		R marked	1	B1
	b		60^o	1	B1 tol $\pm 2^o$
	c		7 or 70 cm or mm	2	B1 tol ± 0.2 cm oe B1 correctly paired (e.g 6.5 - 7.5 with cm) Accept $2\frac{3}{4}$ and inches correctly paired
					Total 4 marks

4	i		X at $\frac{1}{2}$ on scale	1	B1
	ii		X at 0 on scale	1	B1
	iii		X to the right of 0 and to the left of 0.25 on scale	1	B1
					Total 3 marks

5	a		A and D	1	B1
	b		C	1	B1
	c		E	1	B1
					Total 3 marks

6	a		131, 644, 2236, 2466, 4576	1	B1
	b		1822	1	B1
	c		1885	1	B1
	d		22	1	B1
					Total 4 marks

7		4×1.25 (=5) or 2×2.90 (=5.8(0)) $20 - (4 \times 1.25 + 2 \times 2.90)$	9.2(0)	3	M1 For a correct method to find the total cost of the 4 cans of cola or the 2 sandwiches M1 For fully correct method to find the change A1 If no marks awarded, SCB1 For 15.85
					Total 3 marks

8	a		$3x$	1	B1
	b		y^3	1	B1
	c		$6xy$	1	B1
	d		$8t$	1	B1
					Total 4 marks

9	a		24	1	B1
	b	$4 + 6 + 4 + 6 + (6 - 4) + 4 + 6$ or $2 \times (4 + 6 + 4 + 6) - 2 \times 4$ oe	32	2	M1 for a fully correct method to find the perimeter A1
					Total 3 marks

10		Angle ACB or ABC or $BAC = 60^o$ $180^o - 90^o - 60^o$ or $180° - 120° - 30°$	30	3	B1 Could be on diagram (also implied by CBE= 30°) M1 for a complete method A1
					Total 3 marks

11a	a	$4 - 0.8$	3.2	2	M1 A1
	b	$1400000 \times 60 \div 100$	840 000	2	M1 A1
	c	$\frac{0.6}{4}$	$\frac{3}{20}$	2	M1 oe non – simpified form A1
					Total 6 marks

12	a	$-7 + 20$ oe	13	2	M1 A1
	b	$\frac{-7+-6+-1+4+3(+0+0)}{7}$	-1	2	M1 for a correct method to find the mean temperature A1
	c	$4 - -7$ oe	11	2	M1 A1 accept -11
					Total 6 marks

13	a	2.50 + 2.95 ×3		11.35	2	M1 A1
	b	26.10 − 2.50 (= 23.60)	(26.10 – '11.35') ÷ 2.95 (= 5)		3	M1 for taking away 2.50 or use of remainder from cost of 3 km ride found in (a) to find number of extra km
		'23.60' ÷ 2.95	'5' + 3			M1(dep)
				8		A1
						Total 5 marks

14	a	0.625, 0.58, 0.6(0), 0.62	58%, 0.6, $\frac{31}{50}$, $\frac{5}{8}$	2	B2	For all in correct order Award B1 for 3 in correct order or all correct in reverse order or for $\frac{5}{8} = 0.625$ or 62.5% **and** $\frac{31}{50} = 0.62$ or 62%
	b	$\frac{5}{8} \times 72 = 45$ $1 - \frac{5}{8} = \frac{3}{8}$		3	M1	Finding 5/8 of 72 (=45) or showing 3/8 female
		72−'45' $\frac{3}{8} \times 72$			M1	Total minus male or finding 3/8 of 72
			27		A1	cao
						Total 5 marks

15	a		Vertices at (3,5)(7,5)(7,7)(5,7)	2	B2	If not B2 then B1 for correct size shape in wrong position but correct orientation or 3 correct coordinates, or for enlargement SF3 centre (1,1)
	b		Enlargement SF 0.5, centre (1,1)	1	B1	Single transformation only
						Total 3 marks

16		eg $\frac{9}{24}+\frac{5}{24}=\frac{14}{24}$	Shown	2	M1 A1	for conversion to two correct fractions with the same denominator for a correct fraction equivalent to $\frac{7}{12}$
						Total 2 marks

17	a	$4x = 13 - 5$	2	2	M1 A1	$4x = 13 - 5$
	b	Eg $6t - 2t = 5 + 9$ or $4t = 14$ or $-4t = -14$ oe		3	M2	For all t terms on one side and all numbers on the other side of a correct equation or M1 for all t terms on one side **or** all numbers on one side of a correct equation eg $4t - 5 = 9$ or $6t = 2t + 14$ or $6t - 2t - 5 = 9$ or $6t = 2t + 9 + 5$ etc
			3.5		A1	oe dep on M1
	c	$6y + 6 + 2y - 8$	$8y - 2$	2	M1 A1	For 3 correct terms oe eg $2(4y - 1)$ (NB: $8y + -2$ is M1 only)
	d		$\frac{w}{2}$	2	B2	oe eg $0.5w$ B1 for a partial, but correct, simplification with at least 2 correct cancellations, eg $\frac{4w}{8}$, $\frac{wx}{2x}$, $\frac{2w}{4}$, $\frac{wy}{2y}$, $w(4\div 8)$ etc **or** kw where k is a number and $k \neq ½$
						Total 9 marks

18	a	$\frac{1.75}{2.1} \times 100$ oe	83.3	2	M1	Fully correct method to find %
					A1	83.3 or better
	b	54.99 × 5.52 (= 303.(54...)) or 343 ÷ 5.52 (=62.(137...))		3	M1	
		343 − (54.99 × 5.52)(=39.(45..)) or (343 ÷ 5.52) – 54.99 (=7.(14...))			M1	
			39		A1	(also accept answers in range 39.45 to 39.5)
	c	7h 24 min = 7.4 h $\left(or 7\frac{24}{60} \right)$ oe or 444 (mins) or 26640 (secs)		3	B1	
		$\frac{5522}{7.4}$ or $\frac{5522}{444} \times 60$ or $\frac{5522}{26640} \times 3600$			M1	use of d/t, allow $\frac{5522}{7.24}$
			746		A1	746 - 746.22
						Total 8 marks

19	a	$360 - 2 \times 111 - 90$	48	2	M1 A1	
	b	$111 - 90$	21	2	M1 A1	
	c	$540 - 90 - 90 - 111 - 111$ **or** $180 - 2 \times$ '21' **or** $2 \times (180 - 111)$ **or** $360 - 111 = 249$ $180 - (360 - $ '21' $- 249 - 48)$ oe	138	3	M2 A1	For a fully correct method to find angle y or M1 if using pentagon for $(5-2)\times180$ (=540) or for an isosceles triangle drawn with y at apex or for showing use of parallel lines on diagram
						Total 7 marks

20	a		7, −1, −2, 7	2	B2 B1	all correct for 2 or 3 correct
	b		Correct curve	2	M1 A1	for plotting at least 6 points correctly from their table (dep on B1 earned in (a)) fully correct curve
	c		4.4 – 4.5	1	B1	ft any parabola with 2 intersections with $y = 4$, 1 value for x only. Condone eg (4.4, 4)
						Total 5 marks

21			$x = 10$	3	B1	
		$3 + 6 + x + y = 4 \times 11$ oe			M1	Showing that the total of the 4 numbers is 4×11 oe, eg $x + y = 35$ (ft incorrect x for M1) or values of x and y that total 35 (where $x \neq 10$, $y \neq 25$)
			$y = 25$		A1	
						Total 3 marks

22		$\pi \times 3^2 (= 9\pi = 28.(27..))$ or $\pi \times (3+2)^2$ $(= 25\pi = 78.(53..))$		3	M1	A correct calculation for the area of one of the circles
		$\pi \times 5^2 - \pi \times 3^2$ oe eg 16π			M1	A correct calculation for the shaded area
			50.3		A1	50.2 – 50.3
						Total 3 marks

23	a	8000:50 or 50:8000 or $\frac{8000}{50}$	160	2	M1 A1	
	b	$\frac{72}{80} \times 50$ oe 72 × 100 ÷ '160'	45	2	M1 A1	A correct method to find the length of the model, ft their answer to (a) cao (If ans 1.6 in (a) then do not award marks for 72 ÷ 1.6 = 45)
						Total 4 marks

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