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Mark Scheme (Results)

January 2020

Pearson Edexcel International GCSE
In Mathematics A (4MA1)
Paper 1FR

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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.
  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.
  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**

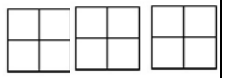
  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

International GCSE Maths				
Apart from questions 15, 17b, 20, 24 (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		8632	1	B1 cao
b		24	1	B1 cao
c		17	1	B1 cao
				Total 3 marks

2	a	5 − 9			M1
			−4	2	A1
	bi		4	1	B1
	bii	−7, −6, −5, −1, 0, 4, 4			M1 for writing the values in the correct order, condone one error or omission **or** for an answer of 0
			−1	2	A1
					Total 5 marks

3	a		Kite drawn	1	B1
	b		Octagon	1	B1
	ci		Cuboid	1	B1
	cii		8	1	B1
					Total 4 marks

4	eg $1 \times 6 + 2 \times 3.50 + 4 \times 4.20$ (= 29.8(0)) $40 - 1 \times 6 - 2 \times 3.50$ (= 27.(00))			M1 for working with at least three of hammer, nails, wood, money, gloves
	$40 - (1 \times 6 + 2 \times 3.50 + 4 \times 4.20)$ (= 10.2(0))			M1 complete method to find the remaining money
	"10.20" ÷ 1.80 (= 5.66...) **or** [their remaining money] ÷ 1.80 **or** 1.80×5 (= 9) **or** 1.80×6 (= 10.8(0))			M1 (dep on M1) method to find the number of pairs of gloves
		5	4	A1 SC B2 for an answer of 14
				Total 4 marks

5	eg 20 ÷ 2.5 (= 8) **or** 32 ÷ 4 (= 8) **or** 20 ÷ 10 (= 2) **or** 32 ÷ 16 (= 2)			M1 for a method to find a key
		8		A1 key completed correctly
	eg 24 ÷ [their 8] **or** 14 ÷ [their 8] **or** 24 ÷ [their 2] **or** 14 ÷ [their 2]			M1 complete method to find the picture for Miss Okoye **or** Dr Syed
		Miss Okoye  Dr Syed 	4	A1
				Total 4 marks

6	a		$15rt$	1	B1	oe
	b	eg $(x =)\ (27 - 5) \div 4$			M1	complete method
			5.5	2	A1	oe
	c	$7 \times 2 - 5 \times 4$			M1	
			-6	2	A1	
	d	$2 \times (-3)^2 - 5$			M1	
			13	2	A1	
						Total 7 marks

7	a		BG, BO, BP, RG, RO, RP, YG, YO, YP	2	B2	all 9 combinations given with no extras or repeats
					(B1)	at least 5 correct combinations given, condone repeats and incorrect combinations
	b		$\frac{1}{3}$	1	B1	oe,ft from (a), accept 0.33(33…)
	c				M1	for $\frac{7}{a}$ where $a > 7$ or $\frac{b}{20}$ where $b < 20$
			$\frac{7}{20}$	2	A1	oe
						Total 5 marks

8	28 ÷ 4 (= 7)			M1
				M1 for using at least six lengths correctly (may be seen on diagram or in calculation)
	e.g. “7” + “3” + 4 + “3” + “7” + 4 + “7” + 4 + “7” + 4			M1 for a complete method to find perimeter
		50	4	A1
				SC Award B2 for an answer of 66 or 68
				Total 4 marks

9	a		24.9	1	B1
	b		7.1	1	B1 oe
	c	7 ÷ 8 × 100 oe			M1
			87.5	2	A1
					Total 4 marks

10 a		050	1	B1	±2°, condone 50
b	7 × 2.5			M1	allow 6.8 – 7.2 for 7
		17.5	2	A1	accept 17-18
c				M1	for a bearing of 115±2° from *A*
				M1	for 20 ÷ 2.5 (= 8) **or** for an arc drawn 8 cm from *B* within tolerance
		C marked within tolerance	3	A1	
					Total 6 marks

11	(−2, −4) (−1, −1) (0, 2) (1, 5) (2, 8) (3, 11) (4, 14)	Correct line between $x = -2$ and $x = 4$	3	B3 for a correct line between $x = -2$ and $x = 4$ B2 for a correct straight line segment through at least 3 of (−2, −4) (−1, −1) (0, 2) (1, 5) (2, 8) (3, 11) (4, 14) **OR** for all of (−2, −4) (−1, −1) (0, 2) (1, 5) (2, 8) (3, 11) (4, 14) plotted but not joined **OR** for a line drawn with a positive gradient through (0, 2) and clear intention to use a gradient of 3 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 a gradient of 3
				Total 3 marks

12	e.g. 36×50 (= 1800)			M1 for calculating outgoings could work in £ or p throughout
	e.g. $36 \times \frac{1}{2} \times 60$ (= 1080) **or** $36 \times \frac{1}{3} \times 40$ (= 480) **or** $36 \times \left(1 - \frac{1}{2} - \frac{1}{3}\right) \times 25$ (= 150)			M1 for working out one source of income
	e.g. $36 \times \frac{1}{2} \times 60 + 36 \times \frac{1}{3} \times 40 + 36 \times \left(1 - \frac{1}{2} - \frac{1}{3}\right) \times 25$ (= 1710)			M1 for complete method to find the total income
	e.g. $\frac{"1800" - "1710"}{"1800"} \times 100$ **or** $\frac{[\text{outgoings}] - [\text{income}]}{[\text{outgoings}]} \times 100$			M1 (dep on first 2 method marks) complete method to find percentage loss
		5	5	A1 accept −5
				Total 5 marks

13 a		Rotation		B1	
		(0, 0)		B1	or *O* or origin
		90° clockwise	3	B1	NB award no marks if more than one transformation is described
b		Shape **R** in correct position	2	B2	Vertices at (−4, 1) (−4, 4) (−5, 4) (−5, 2) (−6, 2) (−6, 1)
				B1	for a correct reflection in the line $x = k$ where $k \neq -1$ **OR** at least 4 vertices in the correct position
					Total 5 marks

14	e.g. $36 \div (2 + 6)$ $(= 4.5)$ **or** $36 \div \frac{2+6}{3+2+6} (= 49.5)$ oe **or** Asha = £9 **OR** Julie = £27			M1
	e.g. $3 \times$ "4.5" **or** $\text{"49.5"} \times \frac{3}{3+2+6}$ **or** $\text{"9"} \times \frac{3}{2}$ **or** $\text{"27"} \times \frac{3}{6}$			M1 or an answer of $\frac{27}{2}$
		13.5(0)	3	A1 SCB1 for 36/5 × 6 (=43.2) or 36/9 × 2 (=8)
				Total 3 marks

15	e.g. $\frac{16}{5}$ **and** $\frac{21}{8}$ oe			M1	both fractions expressed as improper fractions
	e.g. $\frac{\cancel{16}^{2}}{5} \times \frac{21}{\cancel{8}^{1}}$ **OR** $\frac{336}{40}$ oe			M1	correct cancelling **OR** multiplication of numerators and denominators without cancelling
	e.g. $\frac{16}{5} \times \frac{21}{8} = \frac{336}{40} = \frac{42}{5} = 8\frac{2}{5}$ **or** $\frac{16}{5} \times \frac{21}{8} = \frac{336}{40} = 8\frac{16}{40} = 8\frac{2}{5}$ **or** $\frac{\cancel{16}^{2}}{5} \times \frac{21}{\cancel{8}^{1}} = \frac{42}{5} = 8\frac{2}{5}$ **or** candidate clearly shows that in the question, the result of $8\frac{2}{5} = \frac{42}{5}$ and that their answer becomes $\frac{42}{5}$	shown	3	A1	Dep on M2 for conclusion to $8\frac{2}{5}$ from correct working – either sight of the result of the multiplication e.g. $\frac{336}{40}$ must be seen or correct cancelling prior to the multiplication to $\frac{42}{5}$ NB: use of decimals scores no marks
					Total 3 marks

16	a	e.g. $d - g = 2ac$ $\frac{d}{2c} = \frac{g}{2c} + a$			M1	for a correct first step e.g. subtract g from both sides **OR** divide all terms by 2 **OR** divide all terms by c **OR** divide all terms by $2c$
			$a = \frac{d-g}{2c}$	2	A1	oe
	b		$3f(3e-4)$	2	B2	(B1 for $3(3ef-4f)$ or $f(9e-12)$ or $3f(ke-4)$ or $3f(3e-m)$ where $k \neq 0$ and $m \neq 0$)
	c	$x^2 - 5x + 2x - 10$			M1	for any 3 correct terms **or** for 4 out of 4 correct terms ignoring signs **or** $x^2 - 3x\ldots$ **or** for $\ldots -3x - 10$
			$x^2 - 3x - 10$	2	A1	
	d	$\frac{n^{11}}{n^5}$ **OR** $n^{-1} \times n^7$ **OR** $n^4 \times n^2$ **OR** $n^4 \times n^7 \times n^{-5}$ **OR** $n^{"11"} \div n^5 = n^{("11"-5)}$			M1	for simplifying two terms
			n^6	2	A1	
						Total 8 marks

17	ai		b, l, u, e, g, r, y	1	B1	No incorrect or repeats
	aii		w, h, i, t	1	B1	No incorrect or repeats
	b		No with reason	1	B1	eg 'e is in all three sets' **OR** 'all three sets share a member' **OR** $B \cap G \cap W = (\{\})e(\{\})$
						Total 3 marks

18	$\pi \times 7.2^2 \div 2$ (= 81.4....)			M1	allow 81.3 – 81.5 for area of semi circle
	"81.4" ÷ 6 (= 13.5...) **or** 12 × 6 (= 72) **or** "81.4" ÷ 12 (= 6.7...)			M1	(dep) allow 13.5 – 13.6 for the number of boxes needed (NB: 12 × 6 = 72 alone is 0 marks)
		No with correct figures	3	A1	
					Total 3 marks

19	a		4.35	1	B1	accept 4.349&
	b		4.25	1	B1	cao
						Total 2 marks

20	$(x \pm 9)(x \pm 4)$	$\frac{-(-5) \pm \sqrt{(-5)^2 - 4 \times 1 \times (-36)}}{2 \times 1}$ **or** $\frac{5 \pm \sqrt{25 + 144}}{2}$			M1	**or** $(x + a)(x + b)$ where $ab = -36$ **or** $a + b = -5$ **OR** correct substitution into quadratic formula (condone one sign error in a, b or c) (if + rather than ± shown then award M1 only unless recovered with answers)
	$(x - 9)(x + 4)$	$\frac{5 \pm \sqrt{169}}{2}$ **or** $\frac{5 \pm 13}{2}$			M1	**or** $\frac{5 \pm \sqrt{169}}{2}$ **or** $\frac{5 \pm 13}{2}$
			9, −4	3	A1	dep on at least M1
						Total 3 marks

21	20.40 ÷ (1 – 0.15)			M2	for a complete method eg 20.40 ÷ (1 – 0.15) for 20.40 ÷ (100 – 15) (= 0.24) (M1) **or** e.g. 0.85x = 20.40
		24	3	A1	
					Total 3 marks

22	28 × 5 (= 140) **OR** 26.5 × 2 (= 53)			M1	or 87
	(28 × 5 − 26.5 × 2) ÷ (5 – 2)			M1	for a complete method
		29	3	A1	
					Total 3 marks

23	1.5 × 2 × 8 (= 24 (cm^3))			M1	for finding the volume of the cuboid
	e.g. (V =) $\frac{5.73\times1000}{19.32}$ (= 296.58...) **or** (M =) 19.32 × “24” (= 463.68)			M2	complete method to find the volume of statue **or** the mass of one block, could work in g or kg (if not M2 then award M1 for correct use of density formula e.g. $19.32 = \frac{5.73\times1000}{V}$ **or** $19.32 = \frac{M}{"24"}$)
	e.g. “296.58” ÷ “24” (= 12.3576...) **or** “5730” ÷ “463.68” (= 12.3576...)			M1	could work in g or kg
		13	5	A1	cao
					Total 5 marks

24	e.g. $6(x - 1)$ $(= 6x - 6)$			M1	method to find expression for perimeter of hexagon
	e.g. $2(x + 5) + 2x - 3$ $(= 4x + 7)$			M1	method to find expression for perimeter of triangle
	"$6x - 6$" = "$4x + 7$"			M1	(dep on at least M1) for equating both expressions
	e.g. $6x - 4x = 7 + 6$			M1	(dep on previous M1 and equation of the form $ax + b = cx + d$)for rearranging the x terms on one side and the numerical terms on the other and all expansions correct.
		5.5	5	A1	oe (dep on M2)
					Total 5 marks

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