Pearson Edexcel

Mark Scheme (Results)

Summer 2019

Pearson Edexcel International GCSE
In Mathematics A (4MA1)
Paper 2FR

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Summer 2019
Publications Code 4MA1_2FR_1906_MS

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.

International GCSE Maths						
Apart from Q2 (where the mark scheme states otherwise) the correct answer, unless obtained from an incorrect method, should be taken to imply a correct method.						
Question		**Working**	**Answer**	**Mark**	**Notes**	
1	(a)		Nine thousand two hundred and eighty	1	B1	
	(b)		New York	1	B1	
	(c)		700	1	B1	
	(d)		Kolkata	1	B1	
	(e)		17 000	1	B1	
						Total 5 marks

2	(a)		24	1	B1	
	(b)	26 – 16 (= 10)	10	2	M1 A1	
	(c)		One and half naan breads drawn	1	B1	
	(d)	24 + 20 + 16 + 26 + 12 (= 98) or 12 × 8 + 2 (= 98)	No and 98 seen	2	M1 A1	Must see “No” or “Not correct”, “Wrong” etc.
						Total 6 marks

3	(a)		Obtuse	1	B1	
	(b)		Octagon	1	B1	
						Total 2 marks

4	(a)		Marked at 0	1	B1	
	(b)		Marked at 0.5	1	B1	
						Total 2 marks

Question		Working	Answer	Mark	Notes	
5	(i)		81	1	B1	
	(ii)		10	1	B1	
	(v)		23	1	B1	
						Total 3 marks

6	(a)	$\frac{40.194}{8.76}$	4.5883(56164)	2	M1 A1	40.194 or 8.76 seen or implied by 4.588 At least 4 digits reqd after decimal point.
	(b)		4.6	1	B1ft	For 4.6 or ft from (a) if at least 3 s.f.
						Total 3 marks

7	(a)		(2 , 3)	1	B1	
	(b)		*D*	1	B1	
	(c)	(−2 + 4) ÷ 2 or (3 + 1) ÷ 2	(1 , 2)	2	M1 A1	
						Total 4 marks

8		1200 ÷ 45 (=26.66..) 1200 – (“26” × 45)	30	3	M1 M1 dep A1	or 26 x 45 (=1170)
						Total 3 marks

9		(minutes =) 35 + 15 (= 50) or (hours =) 5	5 hours 50 minutes	2	M1 A1	Accept 4 hours and 110 minutes oe
						Total 2 marks

Question		Working	Answer	Mark	Notes	
10	(a)	360° − (90° + 90° + 140°) or 2 × (180° − 90° − 70°)	 40°	2	M1 A1	or 180 – 140 or 90 + 90 +140 + *x* = 360
	(b)	33 × 12 or $\frac{1}{2} \times 33 \times 12 \times 2$	 396	2	M1 A1	
						Total 4 marks

11		Capacity of 1 brick = 9 x 3 x 5 (= 135) Capacity of 5700 bricks = 5700 x "135" (= 769500) Capacity of 1 crate = 72 x 36 x 75 (= 194400) Capacity of 4 crates = 4 x "194400" (= 777600) Bricks needed in 1 crate = 5700 ÷ 4 (= 1425) Max no: of bricks in 1 crate = 8 x 12 x 15 (= 1440) or 194400 ÷ 135 (=1440)	Yes as 777600 > 769500 or Yes as 1440 > 1425	4	M3 A1	M3 for calculations leading to any 3 of 135, 769500, 194400, 777600, 1425 or 1440 M2 for any 2 of the above M1 for any 1 of the above NB: sight of 769500 implies 135 and sight of 777600 implies 194400 Comparing 777600 with 769500 or Comparing 1440 with 1425
		Alt: max number of bricks in 4 crates v 5700 72 ÷ 9 (=8) and 36 ÷ 3 (=12) and 75 ÷ 5 (= 15) "8" × "12" × "15" (= 1440) "1440" × 4 (= 5760) or 5700 ÷ 4 (= 1425)	Yes as 5760 > 5700 or Yes as 1440 > 1425		M1 M1 M1 A1	**NB. To get A1 they have to state that there is enough room for the bricks or "Yes") and justify this by referring explicitly to 2 values e.g 777600 – 769500 (= 8100)** Dividing lengths, widths & heights Max number of bricks in 1 crate Max number of bricks in 4 crates Yes + comparison of 2 numbers **NB. Ditto comments above**
						Total 4 marks

Question		Working	Answer	Mark	Notes	
12	(a)	$\frac{13+8+8+6+5}{2}$ or $\frac{(13+8+8+6+5)+1}{2}$ or $\frac{40}{2}$ or $\frac{41}{2}$ or 20 or 20.5	22	2	M1 A1	A clear attempt to list the 40 numbers in order and to find the middle number.
	(b)	(21 × 13) + (22 × 8) + (23 × 8) + (24 × 6) + (25 × 5) (= 273 + 176 + 184 + 144 + 125) (= 902) "902" ÷ 40	22.55	3	M1 M1 dep A1	At least 4 products correctly stated or evaluated Accept 22 or 23 if 22.55 seen
						Total 5 marks

13	(a)	$3f = 11 + 5$ or $3f = 16$	$\frac{16}{3}$ oe	2	M1 A1	A correct rearrangement of numbers on one side accept $5\frac{1}{3}$ or 5.3 with recurring symbol or 5.33 (at least 2 3's) NB. 16/3 in body of script then 5.3 on ans line = M1 A1 5.3 on ans line with no working = M1 A0
	(b)		$w^2 + 3w$	1	B1	
	(c)	$5(-3)^2 + 20$	65	2	M1 A1	Ans of – 25 = M1 A0 if substitution seen
	(d)		$(x + 4)(x - 9)$	2	M1 A1	For $(x + a)(x + b)$ where $ab = -36$ and a and b are integers Ignore extension to roots $x = -4$ & 9
						Total 7 marks

Question		Working	Answer	Mark	Notes	
14		150 ÷ 6 (= 25) or 420 ÷ 6 (= 70) or 170 ÷ 6 (= 28.333…) or 95 ÷ 6 (= 15.83…)		4	M1	Ingredients for 1 pie
		755 ÷ "25" (= 30.2) and 1265 ÷ "70" (= 18.07…) and 685 ÷ "28.333…" (= 24.176…) and 950 ÷ "15.83…" (= 60)			M2 dep	M2 for calculations of all 4 ingredients If not M2 then M1 for 1 correct calculation
			18		A1	cao (must be an integer)
		Alt: 755 ÷ 150 (= 5.0333..) or 1265 ÷ 420 (= 3.0119 ..) or 685 ÷ 170 (= 4.029..) or 950 ÷ 95 (= 10)			M1	
		"5" × 6 (= 30) and "3" × 6 (= 18) and "4" × 6 (= 24) and "10" × 6 (= 60)			M2 dep	M2 for calculations of all 4 ingredients. These values do not have to be integers.
			18		A1	If not M2 then M1 for 1 correct calculation cao (must be an integer) 18.07 .. as a selected answer = M3 A0 Correct answer is <u>not</u> dependent on M3
						Total 4 marks

15	(a)		13.5	1	B1	
	(b)	16.24 ÷ 2.03 (= 8) reading from graph from their "8"	 85 → 90	3	M1 M1 dep A1 ft	 Dependent on 1st M1 if not 85 → 90
						Total 4 marks

16	(a)		080°	1	B1	80° ok. Accept 78° → 82°
	(b)		 (×) in correct position	3	M1 M1 A1	9 cm stated or shown on diagram 8.9 to 9.1 acceptable Correct bearing (118° to 122°)
						Total 4 marks

Question		Working	Answer	Mark	Notes	
17	(a)		$x > -3$	1	B1	Accept $-3 < x$
	(b)	$4y - y \leq 8 + 13$	$y \leq 7$	2	M1 A1	Arranging y's on one side and the numbers on the other side. (allow $4y - y = 8 + 13$ oe or $4y - y < 8 + 13$ oe or $4y - y > 8 + 13$ oe or $4y - y \geq 8 + 13$ oe) Allow $y \leq 21/3$
						Total 3 marks

18		$\frac{17}{3}(-)\frac{11}{4}$ oe or $5\frac{8}{12}(-)2\frac{9}{12}$ $\frac{68}{12} - \frac{33}{12}$ or $4\frac{20}{12} - 2\frac{9}{12}$ $\frac{35}{12} = 2\ \frac{11}{12}$		3	M1 M1	Sight of $\frac{17}{3}$ and $\frac{11}{4}$ or $5\frac{8}{12}$ and $2\frac{9}{12}$ or $\frac{68n}{12n} - \frac{33n}{12n}$
		Alt: $3\ (+)(\frac{2}{3} - \frac{3}{4})$ $3\ (+)(\frac{8}{12} - \frac{9}{12})$ $3 - \frac{1}{12} = 2\ \frac{11}{12}$			A1 M1 M1	Dep on M2
		Alt: $4\frac{5}{3} - 2\frac{3}{4}$ $2\ (+)(\frac{5}{3} - \frac{3}{4})$ $2\ (+)(\frac{20}{12} - \frac{9}{12})$ $= 2\ \frac{11}{12}$			A1 M1 M1 A1	Dep on M2 Dep on M2

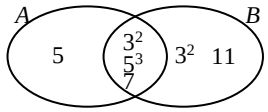
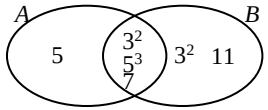
						Total 3 marks

Question		Working	Answer	Mark	Notes	
19	(a)		–5, 5, 5, –5	2	B2	All 4 correct values If not B2 then B1 for 2 or 3 correct values
	(b)		Fully correct curve	2	M1 A1	Plotting at least 6 points correctly from their table dep on B1 in part(a) Do not accept horizontal line at top of curve or straight line segments
						Total 4 marks

20	(a)	40 ÷ 16 × 12	30	2	M1 A1	$40 \times \frac{12}{16}$ oe
	(b)	$525 \div 100^2$	0.0525 oe	2	M1 A1	
						Total 4 marks

21		P(mint =) 1 – (0.35 + 0.32 + 0.12) (= 0.21) P(strawberry or mint =) 0.32 + "0.21"	0.53 oe	3	M1 M1 A1	Or a correct equation summing to 1 Dep Allow 0.53/1
						Total 3 marks

22		55 ÷ (6 + 3 + 2) {= 5} (6 x "5") – (2 x "5")	20	3	M1 M1 A1	or $\frac{6}{11}$ x 55 or $\frac{2}{11}$ x 55 or M2 for Won = 30 <u>and</u> Lost = 10
						Total 3 marks

Question		Working	Answer	Mark	Notes	
23	(a)		7875	2	M1 A1	$3^2 \times 5^3 \times 7$ oe or correct Venn diagram
	(b)		3 898 125	2	M1 A1	$3^4 \times 5^4 \times 7 \times 11$ oe or correct Venn diagram
						Total 4 marks

24	(a)		8.4×10^5	1	B1	
	(b)	$\frac{60000000}{0.08}$ or 750000000 oe (e.g 0.75×10^9)	7.5×10^8	2	M1 A1	M1 for 60000000 or 0.08
						Total 3 marks

25		150000×0.82^3	82705	3	M2 A1	If not M2 then M1 for 1st year e.g 150000 x 0.82 {= 123000} or 150000 x 0.18 {= 27000} SC B1 for 150000 x 1.18 {= 177000} or 150000×1.18^3 {= 246454.8}or 150000 x 0.54 {=81000} or 150000 x 0.46 {= 69000} Accept 82705.2
						Total 3 marks

26		$m = (-)4 \div 2$	$y = -2x - 1$	3	M1 B2	Correct method to work out the gradient accept $4 \div 2$ or $m = 2$ If not B2 then B1 for $L = -2x - 1$ or $-2x - 1$ or $y = 2x - 1$ or $y = -2x + c$
						Total 3 marks

Question		Working	Answer	Mark	Notes	
27		$\sin 32 = \frac{BD}{3.1}$ $BD = 3.1 \times \sin 32$ (= 1.6427...) $\cos 42 = \frac{"3.1\sin 32"}{AB}$ or $\frac{AB}{\sin 90} = \frac{"3.1 \sin 32"}{\sin 48}$ $AB = \frac{"3.1\sin 32"}{\cos 42}$ or $AB = \frac{"3.1 \sin 32"}{\sin 48}$	2.21	5	M1 M1 M1 M1 A1	 Accept 1.6 or better Dep or (AD =) "1.6.. x tan 42 {= 1.479} Dep or (AB =) $\sqrt{"1.479"^2 + "1.6427"^2}$ 2.21053... (Accept 2.20 → 2.22)
						Total 5 marks

						Total for Paper: 100 marks

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