GradeMax

Pearson Edexcel

Mark Scheme (Results)

January 2022

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

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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.

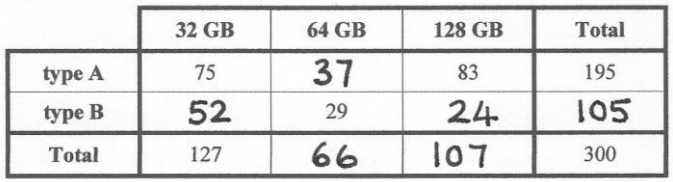
International GCSE Maths				
Apart from question 9c, 13, 21b the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	**Working**	**Answer**	**Mark**	**Notes**
1 (a)		Two thousand and fifty one	1	B1
(b)		1700	1	B1
(c)		1479	1	B1
(d)		1150	1	B1
				Total 4 marks

2 (a)		20	1	B1
(b)	32, “20”, 18, 22		2	M1ft for at least 3 correct values **or** clear use of multiples of 8
		92		A1ft 72 + “answer to (a)”
(c)		3 and ¼ symbols	1	B1
				Total 4 marks

3	(a)		14 squares shaded	1	B1	any 14 squares shaded
	(b)		two tenths	1	B1	allow 'tenths' or $\frac{2}{10}$
	(c)		0.625	1	B1	
	(d)		2.008, 2.081, 2.8, 2.803, 2.83	2	B2	for all numbers in correct order
					(B1	for one number when covered leaves the others in order **or** for all numbers in correct reverse order)
						Total 5 marks

4	(a)		4.5 cm or 45 mm	2	B2	for 4.5 cm or 45 mm (allow 4.3 – 4.7 cm or 43 – 47 mm)
					(B1	for 4.5 (allow 4.3 – 4.7) **or** 45 (allow 43 – 47) **or** cm with a value from 4 – 5 **or** mm with a value from 40 – 50)
	(b)		29	1	B1	(± 2)
	(c)		the pair of parallel sides marked	1	B1	only 2 sides marked correctly
	(d)		pentagon	1	B1	
						Total 5 marks

5	eg 3 × 2.45 (= 7.35) **or** 2 × 6.2(0) (= 12.4(0)) **or** 3 × 2.45 + 2 × 6.2(0) (= 19.75)		4	M1	for working out the cost of the seeds **or** the compost **or** the seeds and the compost
	eg 34.35 – "7.35" – "12.40" (= 14.6(0)) **or** 34.35 – "19.75" (= 14.6(0))			M1	for working out the cost of the 4 plant pots
	"14.60" ÷ 4			M1	for a complete method to find the cost of one plant pot
		3.65		A1	If no other marks awarded, SCB2 for answer of 6.42 – 6.43 SCB1 for 25.7(0)
					Total 4 marks

6	(a)			3	B3 For all correct entries (B2 for 4 or 5 correct entries) (B1 for 2 or 3 correct entries)
	(b)		$\frac{29}{300}$	1	B1 oe eg 0.096(666…)
	(c)		$\frac{83}{195}$	2	B2 oe eg 0.42(564…) (B1 for $\frac{83}{m}$ where $m > 83$ or $\frac{n}{195}$ where $n < 195$)
					Total 6 marks

7	(a)		6	1	B1
	(b)		19	1	B1
	(c)		$5h$	1	B1 oe
	(d)		$3a + 11f$	2	B2 oe eg $11f + 3a$ (B1 for $3a$ or $11f$)
					Total 5 marks

8	2 m written as 200 cm or 35 cm written as 0.35 m		3	B1	made be seen in workings
	"200" ÷ 35 **or** 2 ÷ "0.35" (= $\frac{40}{7}$ or 5.714...) **or** indication of 175 (cm) or 1.75 (m)			M1	**or** clearly adding on 35 or 0.35 at least 5 times with no more than one error **or** clearly subtracting 35 or 0.35 at least 5 times from 200 or 2 with no more than one error ft incorrect conversion but attempt must have been made to convert
		25		A1	
					Total 3 marks

9	(a)		26	1	B1	
	(b)	eg $\frac{30-12}{30}\left(=\frac{18}{30}\text{oe}\right)$		2	M1	for $\frac{18}{30}$ or other correct but unsimplified fraction **or** an answer of $\frac{2}{5}$
			$\frac{3}{5}$		A1	
	(c)	eg $\frac{8}{18}+\frac{3}{18}$ or $\frac{24}{54}+\frac{9}{54}$ oe		2	M1	for two fractions with a correct common denominator with at least one numerator correct
		eg $\frac{8}{18}+\frac{3}{18}=\frac{11}{18}$ or $\frac{24}{54}+\frac{9}{54}=\frac{33}{54}=\frac{11}{18}$ oe			A1	dep on M1, for a complete correct method leading to $\frac{11}{18}$
						Total 5 marks

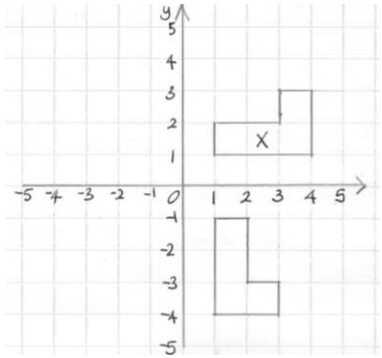
10	eg $\pi\times\left(\frac{14}{2}\right)^2$ oe **or** $\pi\times7^2$ oe **or** 49π		2	M1	
		154		A1	accept 153.86 – 154
					Total 2 marks

11	(a)	eg 15.59 **or** 0.477 **or** 0.478 **or** 0.4778 **or** 0.4779 **or** $\frac{745}{1559}$		2	M1	for calculating the denominator **or** for answer with 3 or 4 dp **or** for the correct fraction
			0.47787(04298…)		A1	must have minimum of 5 dp
	(b)		0.478	1	B1ft	dep on at least 4 decimal places
						Total 3 marks

12	$C - 5$ oe **or** $2C$ oe **or** T = a linear expression in C		3	M1	for one of $C - 5$ oe **or** $2C$ oe **or** T = linear expression in C
	$C + C - 5 + 2C$ $(= 4C - 5)$ oe **or** for T = an expression in C with the expression in C coming from adding at least 2 of C, $2C$, $C - 5$ eg $T = 2C + C - 5$ or $T = C + C^2 + C - 5$			M1	
		$T = 4C - 5$		A1	oe but must be simplified eg allow $T = 4 \times C - 5$
					Total 3 marks

13	eg 2.5 × 6.5 (= 16.25) **or** 0.5 × 6.5 × 1 (= 3.25) **or** 3.5 × 6.5 (= 22.75)		4	M1	M2 for 0.5(2.5 + 3.5) × 6.5 (= 19.5) **or** 2 × (0.5(2.5 + 3.5) × 6.5) (= 39)
	2.5 × 6.5 + 0.5 × 6.5 × 1 (= 19.5) **or** 2 × (2.5 × 6.5 + 0.5 × 6.5 × 1) (= 39) **or** 3.5 × 6.5 – 0.5 × 6.5 × 1 (= 19.5) **or** 2 × (3.5 × 6.5 – 0.5 × 6.5 × 1) (= 39)			M1	
	2 × "19.5" ÷ 12 (= 3.25) **or** "39" ÷ 12 (= 3.25) **or** 12 + 12 + 12 + 12 (= 48) **or** 4 × 12 (= 48)			M1	**or** [their area] ÷ 12 (dep on M1) **or** using multiples of 12 for [their area] eg area = 19.5 **and** 12 + 12 (= 24) **or** 2 × 12 (= 24)
		4		A1	dep on M2, must be from correct working
					Total 4 marks

14	(−2, −7), (−1, −5), (0, −3), (1, −1), (2, 1), (3, 3), (4, 5)	line $y = 2x - 3$ drawn	3	B3	For a correct line between $x = -2$ and $x = 4$ (B2 for a straight line segment through at least 3 of the given points **OR** for all of the points plotted and not joined **OR** for a line drawn through (0, −3) with a clear attempt at a gradient of 2 (eg a line through (0, −3) and (1, −1)) (B1 for at least 2 correct points stated or plotted (may be in table); ignore any incorrect points either plotted or evaluated **OR** for a line drawn with positive gradient through (0, −3) **OR** for a straight line with gradient 2)
					Total 3 marks

15 (a)			2	B2	for a correct rotation (B1 for a shape of the correct orientation in the incorrect position **or** for the correct shape in the correct position for a 90° anticlockwise rotation)
(b)		Translation with vector $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$	2	B1 B1	Translation (with none of reflection, rotation, enlargement, mirrored, turned or flipped stated) $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$ (award if no equation of line or angle of rotation or centre of rotation or scale factor or centre of enlargement mentioned)
					Total 4 marks

16	(a)		a^{11}	1	B1	
	(b)		w^{12}	1	B1	
	(c)		$64x^{10}y^{6}$	2	B2	if not B2 then award B1 for 2 correct parts as part of a product eg $kx^{10}y^{6}$ where $k \neq 64$ **or** $64x^{k}y^{6}$ where $k \neq 10$ **or** $64x^{10}y^{k}$ where $k \neq 6$
	(d)	$c + 8v = t^3$		2	M1	
			$t = \sqrt[3]{c+8v}$		A1	oe SCB1 for an answer of $t = \frac{c+8v}{3}$ oe
						Total 6 marks

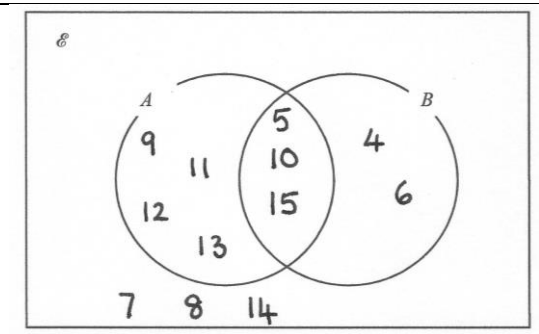
17	196 ÷ (9 – 5) (= 49) oe		3	M1	
	3 × "49"			M1	
		147		A1	SCB1 for an answer from 34.5 – 34.6 **or** an answer of 42
					Total 3 marks

18	eg $\sin 65 = \frac{AB}{8.4}$ **or** $\frac{AB}{\sin 65} = \frac{8.4}{\sin 90}$		3	M1	for setting up a trig equation in AB
	eg $(AB =)\ 8.4\sin 65$ **or** $(AB =)\frac{8.4\sin 65}{\sin 90}$			M1	for a complete method
		7.61		A1	accept 7.61 – 7.613
					Total 3 marks

19	eg $\frac{2}{5}\times 150 (=60)$ **or** eg 0.32×150 (= 48)		5	M1	for finding the number of small mugs **or** number of medium mugs
	eg 150 – "60" – "48" (= 42)			M1	for finding the number of large mugs
	eg "60" × 8.50 + "48"× 11.20 + "42" × 14.20(= 1644) **or** 510 + 537.6 + 596.4 (= 1644)			M1	for working out the income, Profit = 504 implies M3
	eg $\frac{"1644"-1140}{1140}\times 100$ **or** $\frac{"1644"}{1140}\times 100-100$			M1	(indep) for a complete method to find the percentage profit for **their total income** (must be greater than 1140) An answer of 144 implies M4
		44		A1	44 or better (44.2105…)
					Total 5 marks

20	(a)		(5), 8, 8, 20, *x*, (24)	3	B3 for (5), 8, 8, 20, *x*, (24) where *x* = 21 **or** 22 **or** 23 (B2 for (5), 8, 8, 20, *x*, (24) where *x* is blank or **any** value other than 21, 22 or 23) (B1 for a list with a median of 14 **or** a mode of 8 **or** the 3rd and 4th cards having a sum of 28 (ignoring other cards))
	(b)	eg 5 × 21 (= 105) **or** 6 × 23 (= 138)		3	M1
		eg 6 × 23 – 5 × 21			M1
			33		A1
					Total 6 marks

21 (a)	$5x \le 2+7$ **or** $5x \le 9$ **or** $\frac{5x}{5} - \frac{7}{5} \le \frac{2}{5}$ oe		2	M1	allow any sign instead of ≤ **or** for an answer of 1.8 oe **or** x and 1.8 oe with the incorrect sign
		$x \le 1.8$		A1	oe
(b)(i)	$(y \pm 7)(y \pm 5)$		2	M1	for $(y \pm 7)(y \pm 5)$ **or** $(y + a)(y + b)$ where $ab = -35$ **or** $a + b = -2$
		$(y - 7)(y + 5)$		A1	isw if student goes on to solve the equation in this part
(ii)		7, −5	1	B1ft	answer must ft from their $(y + a)(y + b)$ in (b)(i). Award B0 for 7, −5 if no marks scored in (i)
					Total 5 marks

22			3	B3	all 4 parts of diagram correct (B2 for 2 or 3 parts correct) (B1 for 1 part correct) SCB1 if no marks scored, award B1 if 4,6 in the section $A \cap B'$ and 9, 11, 12, 13 in the section $A' \cap B$
					Total 3 marks

23	$12.6 \times 10^{(-24+145)}$ or 12.6×10^{121} or 1.26×10^{n}		2	M1
		1.26×10^{122}		A1 allow 1.3×10^{122}
				Total 2 marks

24	$17.5^2 - 14^2$ (= 110.25)		4	M1	or for use of cosine rule to find one of the angles eg $28^2 = 17.5^2 + 17.5^2 - 2 \times 17.5 \times 17.5 \times \cos A$ **or** eg $\cos B = \frac{14}{17.5}$
	$\sqrt{17.5^2 - 14^2}$ (=10.5)			M1	**or** for rearranging the cosine rule to eg $\cos A = \frac{17.5^2 + 17.5^2 - 28^2}{2 \times 17.5 \times 17.5}$ (A = 106.26...) **or** eg $B = \cos^{-1}(\frac{14}{17.5})$ (= 36.86...)
	0.5 × 28 × "10.5" oe			M1	**or** for 0.5 × 17.5 × 17.5 × sin106.26... oe eg 0.5 × 17.5 × 28 × sin36.86... [clear use of Heron's formula: M1 for S = 0.5(17.5 + 17.5 + 28)(=31.5) M2 for $\sqrt{"31.5"("31.5"-17.5)^2("31.5"-28)}$ oe]
		147		A1	accept awrt 147
					Total 4 marks

25 (a)	eg $2y = -7x(+10)$		2	M1	for $2y = -7x(+10)$ **or** an answer of $-3.5x$ oe **or** an answer of 3.5 oe
		-3.5		A1	oe
(b)		(0, 5)	1	B1	cao
					Total 3 marks

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