Pearson Edexcel

Mark Scheme (Results)

November 2023

Pearson Edexcel International GCSE

In 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
- 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 mark the one that leads to the answer on the answer line. If there is no answer given then mark the method that gives the lowest mark and award this mark.
  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 questions 11, 13, 16b and 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)(i)		40	1	B1 cao
(ii)		27	1	B1 allow 3^3
(b)		–9	1	B1 cao
(c)		21	1	B1 cao
(d)		2 + odd prime number	1	B1 eg. 2 + 3, 2 + 5 etc
				Total 5 marks

2 (a)		Canada	1	B1
(b)		420	1	B1 cao
(c)		90	1	B1 cao
(d)		Correct bar chart	1	B1 Allow ± half square tolerance for height of bar
				Total 4 marks

3 (a)		reflex	1	B1
(b)		radius	1	B1
(c)		pentagon	1	B1
(d)		9	1	B1 cao
				Total 4 marks

4	(a)		(1, 6)	1	B1
	(b)		(−3, −1)	1	B1
	(c)		Cross at (1, 2)	1	B1
	(d)		Cross at (5, −1)	1	B1
	(e)		1	1	B1 cao
					Total 5 marks

5	(a)		8 squares shaded	1	B1
	(b)		30	1	B1
	(c)		$\frac{8}{25}$	1	B1
	(d)		$6\frac{4}{7}$	1	B1
					Total 4 marks

6	2 × 145.5 (= 291) or 3 × 110 (= 330)		4	M1
	(1000 – (“291” + “330”) (= 379) oe or 1000 – 621 (= 379) oe			M1
	“379” ÷ 30 (= 12(.633…)) oe or 30 + 60 + 90 + 120 + 150 + 180 + 210 + 240 + 270 + 300 + 330 + 360 (+ 390) or 349, 319, 289, 259, 229, 199, 169, 139, 109, 79, 49, 19, (–11) oe or 30 + 30 + 30 + 30 + 30 + 30 + 30 + 30 + 30 + 30 + 30 + 30 (+ 30) oe or “379” – 30 – 30 – 30 – 30 – 30 – 30 – 30 – 30 – 30 – 30 – 30 – 30 (– 30) oe or 360			M1 Allow 12 or 13 subtractions of 30 from “379” (condone one error) oe Allow 12 or 13 additions of 30 giving 360 or 390 (condone one error) oe
		19		A1
				Total 4 marks

7	(a)		$45cd$	1	B1 oe Allow $45dc$, $c45d$, $d45c$, $cd45$ or $dc45$ Allow upper case letters
	(b)		$-2p + 8n$	2	B2 oe eg. $8n - 2p$ If not B2 then award B1 for $-2p$ or $8n$
	(c)	8×9 and $(-)6 \times 5$ oe or 72 and ± 30 oe		2	M1
			42		A1 SCB1 for -14
	(d)	$5m = 17 + 6$ or $5m = 23$ or $m - \frac{6}{5} = \frac{17}{5}$ or $m - 1.2 = 3.4$ or $-17 - 6 = -5m$ or $-23 = -5m$ or $(17 + 6) \div 5$ oe		2	M1 for a correct first step or a calculation for m
		$4 - 3$	$\frac{23}{5}$		A1 oe eg. 4.6 Allow 4,6
					Total 7 marks

8		AE, AP, AW, EP, EW, PW	2	B2 for all combinations with no repeats or incorrect combinations (Allow lower case letters) If not B2 then award B1 for at least 4 correct combinations (ignore repeats or incorrect combinations)
				Total 2 marks

9	$360 - 296$ (= 64)		4	M1 allow angles on the diagram
	$180 - (\text{“}64\text{”} + 42)$ (= 74)			M1
	$(180 - (\text{“}64\text{”} + 42)) \div 2$ or $\text{“}74\text{”} \div 2$			M1
		37		A1
				Total 4 marks

10	(a)		3	1	B1
	(b)	$(0 \times 3) + (1 \times 9) + (2 \times 15) + (3 \times 18) +$ $(4 \times 4) + (5 \times 1)$ (= 114) or (0 +) + 9 + 30 +54 + 16 + 5 (= 114)		3	M1 for at least 5 correct products
		"114" ÷ 50			M1
			2.28		A1 oe SC B2 for 2.34
	(c)			2	M1 for $\frac{23}{a}$ where $a > 23$ or $\frac{b}{50}$ where $b < 50$
			$\frac{23}{50}$		A1 oe eg. 0.46 or 46%
					Total 6 marks

11	360 ÷ 3 × 5 (= 600) oe		5	M1 for finding the total number of vans
	$\frac{4}{9}\times 360$ (= 160) oe or 0.44(444…) × 600 (= 160) oe			M1 for finding the proportion of electric cars
	0.36 × “600” (= 216) oe			M1 for finding the proportion of electric vans
	“216” – “160”			M1
		56		A1
				Total 5 marks

11 Misread 1	$\frac{3}{8}\times 360\left(=135\right)$ or $\frac{5}{8}\times 360\left(=225\right)$		3	M0
	$\frac{4}{9}\times$"135" (= 60) oe or 0.44(444…) × “135” (= 60) oe			M1 for finding the proportion of electric cars
	0.36 × “225” (= 81) oe			M1 for finding the proportion of electric vans
	“81” – “60”			M1
		21		A0
				Total 3 marks

11 Misread 2	360 ÷ 5 × 3 (= 216) oe		3	M0 for finding the total number of cars
	$\frac{4}{9}\times$"216" (= 96) oe or 0.44(444…) × “216” (= 96) oe			M1 for finding the proportion of electric cars
	0.36 × “360” (= 129(.6)) oe			M1 for finding the proportion of electric vans
	“129(.6)” – “96”			M1 allow 129 – 96 or 130 – 96
		33.6		A0
				Total 3 marks

12	<table><tr><td>***x***</td><td>−2</td><td>−1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>***y***</td><td>11</td><td>8</td><td>5</td><td>2</td><td>−1</td><td>−4</td></tr></table> (−2, 11) (−1, 8) (0, 5) (1, 2) (2, −1) (3, −4)	Correct line between $x = -2$ and $x = 3$	3	B3 for a correct line between $x = -2$ and $x = 3$ (B2 for a correct straight line segment through at least 3 of (−2, 11) (−1, 8) (0, 5) (1, 2) (2, −1) (3, −4) **or** for all of (−2, 11) (−1, 8) (0, 5) (1, 2)(2, −1) (3, −4) plotted but not joined) (B1 for at least 2 correct points stated (may be in a table) **or** plotted **or** for a line drawn with a negative gradient through (0, 5) **or** for a line with a gradient of −3)
				Total 3 marks

13	1750 × 100 (= 175 000)	160 ÷ 100 (= 1.6)		4	M1 for a correct conversion (can be embedded in working) eg. 502(.654…) ÷ 100
	$\pi \times 160$ (= 502(.654…))	$\pi \times$"1.6"(= 5.02…) or			M1
	"175 000 ÷ "502(.654…)" (= 348.151…)	1750 ÷ "5.02…" (= 348.151…)			M1 allow 1750 ÷ "502(.654…)" (= 3.48…) or 175 000 ÷ "5.02" (= 34815…)
			348		A1 cao
					Total 4 marks

14	(a)		30	1	B1 allow 28 – 32
	(b)	[7.8, 8.2] × 4.5		2	M1 allow 7.8 – 8.2
			36		A1 allow 35 – 37
					Total 3 marks

15	(a)		5 7 9 11 13 15	1	B1 all numbers must be present with no repeats. Numbers can be in any order
	(b)		5 15	1	B1
	(c)		6 8 12 14 16	1	B1
					Total 3 marks

<table>
<tr><td>16 (a)</td><td></td><td>$6p(2q-3)$</td><td>2</td><td colspan="3">B2
If not B2 then award B1 for any correct partial factorisation with 2 factors taken out
(2p or 3p or 6 (2×3)) outside of the bracket
$2p(6q-9)$ or $3p(4q-6)$ or $6(2pq-3p)$
or
allow 6p and one error inside the bracket eg
$6p(2q-a)$ or $6p(b-3)$ oe eg 6p(2q + 3)</td></tr>
<tr><td>(b)</td><td>y + (3y + 7) + (2y − 5) (= 6y + 2) oe or 56 – 7 + 5 (= 54)</td><td></td><td>4</td><td>M1</td><td>M2 for
y + (3y + 7) + (2y − 5) = 56 oe
or
6y = 54 oe</td><td>M3 for
(56 – 7 + 5) ÷ 6 (= 9)
or
54 ÷ 6 (= 9)</td></tr>
<tr><td></td><td>y + (3y + 7) + (2y − 5) = 56 or
“6y + 2” = 56 oe eg 6y = 54</td><td></td><td></td><td>M1</td><td></td><td></td></tr>
<tr><td></td><td>$(y=)\frac{56-2}{6}(=9)$ oe</td><td></td><td></td><td colspan="2">M1 for a correct method to find the value of y or the correct value of y</td><td></td></tr>
<tr><td></td><td></td><td>13</td><td></td><td colspan="3">A1 (or for 9 (gold), 34 (silver) and 13 (zinc) seen) dep on sight of (y =) 9
SCB2 for 16.6 (17 if rounded 16.6 seen) (if no other marks awarded)
SCB1 for 5y + 2 = 56 oe (if no other marks awarded)</td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="3">Total 6 marks</td></tr>
</table>

17	1500 + (36 × 450) (= 17 700)		4	M1
	"17 700" – 12 500 (= 5200) oe or $\frac{\text{"17 700"}}{12\,500}$ (=1.416) oe			M1
	$\frac{\text{"5200"}}{12500}$ (× 100) oe or 0.416 (× 100) or $\left(\frac{\text{"17 700"}}{12\,500} \times 100\right)$ or 141.6 (– 100)			M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	41.6		A1 allow 42 from correct working
				Total 4 marks

18 (a)	1 – 0.58 (= 0.42) or 100 – 58 (= 42) 0.58 + 2*x* + *x* = 1 oe		2	M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	0.14		A1 oe eg 14% (must have % sign) or $\frac{7}{50}$ etc SCB1 for an answer of 14 if no other marks are awarded
(b)	250 × 0.58 oe or 58 + 58 + (58 ÷ 2) oe		2	M1 or for $\frac{145}{250}$
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	145		A1 cao
				Total 4 marks

19	$\pi \times 20 \left(= 20\pi = 62.8 \left(31...\right)\right)$ oe or $2 \times \pi \times \left(20 \div 2\right) \left(= 20\pi = 62.8 \left(31...\right)\right)$ oe or $0.5 \times \pi \times 20 \left(= 10\pi = 31.4 \left(15...\right)\right)$ oe or		3	M1 for use of $\frac{1}{2}\pi d$ or πr or πd or $2\pi r$ oe with $d = 20$ or $r = 20 \div 2$ (= 10)
	3 × ("62.8" ÷ 2) + 20 ÷ 2 + 20 ÷ 2 oe or 1.5 × ("62.8") + 20 ÷ 2 + 20 ÷ 2 oe			M1 for a complete method
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	114		A1 114 – 115 SCB1 for awrt 471
				Total 3 marks

20	eg $1-\frac{1}{6}=\frac{5}{6}$ or 1 – 0.16(666…) (= 0.83(333…) oe or 100(%) – 16(.666…)(%) (= 83(.333…)(%)) oe or 1 − 0.2 (= 0.8) oe or 100(%) − 20(%) (= 80(%))		4	M1 Allow eg 1 – 0.16 (= 0.84) (= 84(%)) 1 – 0.17 (= 0.83) (= 83(%)) rounded or truncated
	$140\ ,\ "\frac{5}{6}"$ (= 168) oe or 140 ÷ "0.83(333…)" (= 168) oe eg 140 ÷ 83.33 × 100 (=168) **or** 136 ÷ "0.8" (= 170) oe eg 136 ÷ 80 × 100 (= 170)			M1 Allow eg 140 ÷ "0.84" = 166(.666…) 140 ÷ "0.83" = 168(.674…) rounded or truncated
	$140\ ,\ "\frac{5}{6}"$ (= 168) oe or 140 ÷ "0.83(333…)" (= 168) oe **and** 136 ÷ "0.8" (= 170) oe			M1 Allow eg 140 ÷ "0.84" = 166(.666…) 140 ÷ "0.83" = 168(.674…) rounded or truncated
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	2		A1 Allow –2
				Total 4 marks

21		$5^3 \times 7^2 \times 11^4$	2	B2 Accept 5^3 **.** 7^2 **.** 11^4 allow 89 676 125 with $5^3 \times 7^2 \times 11^4$ seen If not B2 then award B1 for $5^p \times 7^q \times 11^r$ with two of $p = 3$, $q = 2$ and $r = 4$ (or omission of one with others fully correct) or for 89 676 125 without $5^3 \times 7^2 \times 11^4$ seen or for $5 \times 5 \times 5 \times 7 \times 7 \times 11 \times 11 \times 11 \times 11$ or for an answer of $5^3 + 7^2 + 11^4$ or 5^3 **,** 7^2 **,** 11^4
				Total 2 marks

22 (a)	$8x-3x\geq -10+4$ or $5x\geq -6$ or $10-4\geq -8x+3x$ or $6\geq -5x$		2	M1 for x terms on one side and numbers on the other. Condone = rather than ≤ or any other sign for this mark.
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	$x^3 - \frac{6}{5}$		A1 oe eg $-\frac{6}{5} \pounds x$ Must have correct sign on answer line (sight of correct answer in working space and just −1.2 on answer line gains M1 only)
(b)		$y\geq 2$	3	B1 oe eg $y-2\geq 0$ allow > in place of ≥
		$x\leq 7$		B1 oe eg $x-7\leq 0$ allow < in place of ≤
		$y\leq x$		B1 oe eg $y-x\leq 0$ allow < in place of ≤
				SCB1 for $y=2$, $x=7$ and $y=x$ SCB2 for $y\leq 2$, $x\geq 7$ and $y\geq x$ or $y < 2$, $x > 7$ and $y > x$ Allow < in place of ≤ or vice versa
				Total 5 marks

23	(a)		0.000 587	1	B1 allow 0.000 587(000…) or **.**000 587
	(b)		8.4×10^{7}	1	B1 allow $8.4(000\ldots)\times10^{7}$
	(c)	$8.5\times10^{10}\div1.47\times10^{9}\ (=\frac{8500}{147})$ or $85\ 000\ 000\ 000\div1\ 470\ 000\ 000\ (=\frac{8500}{147})$		2	M1
		Working not required, so correct answer scores full marks (unless from obvious incorrect working)	57.8		A1 oe eg 5.78×10 awrt 57.8 allow 58 or 5.8×10 with correct working seen
					Total 4 marks

24	$\tan 40 = \frac{8}{(AD)}$ or $\frac{(AD)}{\sin(90-40)} = \frac{8}{\sin 40}$ oe or $(AC =) \frac{8}{\sin 40} (= 12.4(457\ldots)$ (D = foot of the perpendicular line)		5	M1
	$(AD =) \frac{8}{\tan 40}$ (= 9.5(3…)) or $(AD =) \frac{8}{\sin 40} \times \sin(90-40)$ (= 9.5(3…)) oe or $(AD =) \sqrt{"12.4"^2 - 8^2} = \sqrt{90.8(977...)}$ (= 9.5(3…)) oe or $(BC^2 =) "12.4"^2 + 22^2 - 2 \times "12.4" \times 22 \times \cos 40$ (= 219.4…) oe			M1
	(DB =) 22 – "9.5(3…)" (= 12.4(659…= 12.5) or $(BC =) \sqrt{"12.4"^2 + 22^2 - 2 \times "12.4" \times 22 \times \cos 40}$ (= $\sqrt{219.4...}$ = 14.8) oe or $(BC =) \sqrt{8^2 + (22 - 9.5(3...))^2}$ (= 14.8) oe			M1
	$\tan x = \frac{8}{"12.5"}$ or $\cos x = \frac{"12.5"}{"14.8"}$ or $\sin x = \frac{8}{"14.8"} (\times \sin 90)$ oe or $\sin x = \frac{\sin 40}{"14.8"} \times "12.4"$ oe or $\cos x = \frac{22^2 + "14.8"^2 - "12.4"^2}{2 \times 22 \times "14.8"}$ oe			M1
	Working required	32.7		A1 Allow 32.3 – 32.8 dep on a correct method shown
				Total 5 marks

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