Pearson Edexcel

Mark Scheme (Results)

November 2024

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

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November 2024
Question Paper Log Number P75932A
Publications Code 4MA1_1F_2411_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				
Values in quotation marks must come from a correct method previously seen unless clearly stated otherwise.				
Q	**Working**	**Answer**	**Mark**	**Notes**
1 (a)		Laerdal	1	B1 allow incorrect spelling
(b)		900	1	B1 allow 9 hundreds
(c)		St Gotthard	1	B1 allow incorrect spelling
(d)		twelve thousand nine hundred (and) forty	1	B1 allow incorrect spelling
(e)		31 512	1	B1 cao
				Total 5 marks

2	(a)(i)		Isosceles	1	B1 allow incorrect spelling
	(ii)		Square	1	B1 allow incorrect spelling
	(b)		Correct line	1	B1
	(c)		4	1	B1 cao
					Total 4 marks

3	(a)		16	1	B1 cao
	(b)	19 and 10 or –9 or 19 – x or y – 10		2	M1 Allow 19 and 10 seen on pictogram x and y are incorrect values
		Correct answer scores full marks (unless from obvious incorrect working)	9		A1 SC B1 for 3 or 6 with or without seeing the figures on the pictogram
	(c)		Three large squares and one small square	1	B1 oe eg 13 small squares
					Total 4 marks

4	(a)		70	1	B1 cao
	(b)		15	1	B1 cao
	(c)		7000	1	B1 allow −40
					Total 3 marks

5 (a)		$11d$	1	B1
(b)		$10pm$	1	B1 or $10mp$
(c)		–24	1	B1 cao
(d)		48	1	B1cao
(e)		a^4	1	B1 cao
(f)	9×8 or 72 **and** $\pm 4 \times 12$ or ± 48		2	M1
	Correct answer scores full marks (unless from obvious incorrect working)	24		A1 cao SC B1 for 76
				Total 7 marks

6	2358 × 0.28 (= 660.24)	2358 × 0.28 (= 660.24)	2358 ÷ 12 (= 196.5)	2358 ÷ 12 (= 196.5)	42 ÷ 0.28 (= 150)	42 × 12 (= 504)		4	M1
	42 × 12 (= 504)	660.24 ÷ 12 (= 55.02)	"196.5" × 0.28 (= 55.02)	42 ÷ 0.28 (= 150)	"150" × 12 (= 1800)	"504" ÷ 0.28 (= 1800)			M1
	"660.24" – "504" or ("55.02" – 42) × 12 oe or ("196.5" – "150") × 12 × 0.28 oe or (2358 – "1800") × 0.28 oe								M1
	Correct answer scores full marks (unless from obvious incorrect working)						156.24		A1
									Total 4 marks

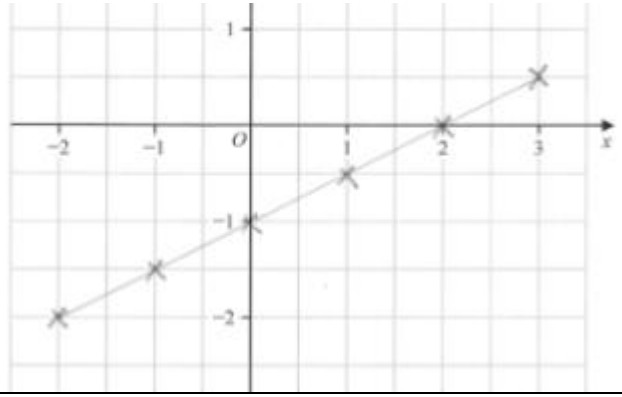
7	180 – 138 (= 42)		4	M1 NB If angles are on the diagram they must be from correct working and correctly assigned
	360 – (“42” + 107 + 125)			M1
	Correct answer scores full marks (unless from obvious incorrect working)	86		A1
		one correct reason		B1 dep on M1for one correct reason (i) Angles on a straight line add to 180° or angles on a straight line add to 180° (ii) Angles in a quadrilateral sum to 360º or angles in a quadrilateral sum to 360°
				Total 4 marks

8	(a)		$\frac{27}{80}$	1	B1 oe 0.33(75) or 33(.75)% truncated or rounded
	(b)	80 – (27 + 10) (= 43) oe or 80 – 37 (= 43) $\frac{80-(27+10)}{80}$ oe or $\frac{80-37}{80}$		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	$\frac{43}{80}$		A1 oe 0.53(75) or 53(.75)% truncated or rounded NB Penalise incorrect notation once
					Total 3 marks

9	41.25 ÷ 15 oe or 2.75 oe or $\frac{52}{15} \times 41.25$ oe		2	M1
	Correct answer scores full marks (unless from obvious incorrect working)	143		A1
				Total 2 marks

10	[5.8, 6.2] × 1.5 (= [8.7, 9.3])	[5.8, 6.2] × 18 (= [104.4, 111.6])		3	M1	M2 for [5.8, 6.2] × 27
	"[8.7, 9.3]" × 18 (= [156.6, 167.4]) or their value × 18	"[104.4, 111.6]"× 1.5 (= [156.6, 167.4]) or their value × 1.5			M1 Do not allow 18 × 1.5 oe on its own	
	Correct answer scores full marks (unless from obvious incorrect working)		162		A1 allow [156.6, 167.4] Ignore attempts at conversions from minutes to hours/minutes or seconds	
						Total 3 marks

11	$c-5=8d$ oe or $-8d=-c+5$ or $\frac{c}{8}=d+\frac{5}{8}$ oe or $\frac{c-5}{8}$ oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	$d=\frac{c-5}{8}$		A1 accept $d=\frac{c}{8}-\frac{5}{8}$ oe or $d=\frac{5-c}{-8}$ oe (must see d = … on answer line or in working)
				Total 2 marks

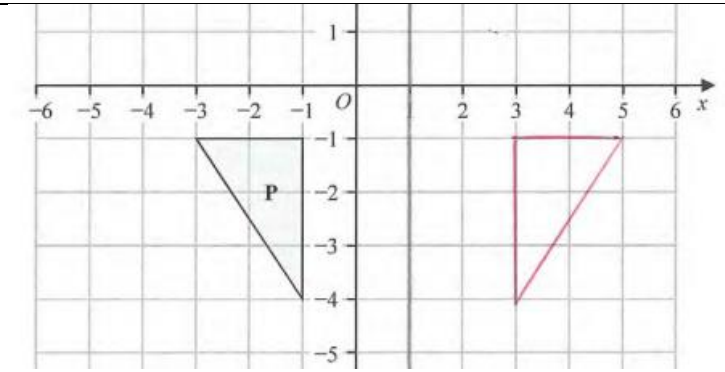
12	<table><tr><td>***x***</td><td>−2</td><td>−1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>***y***</td><td>−2</td><td>−1.5</td><td>−1</td><td>−0.5</td><td>0</td><td>0.5</td></tr></table> (−2, −2) (−1, −1.5) (0, −1) (1, −0.5) (2, 0) (3, 0.5)  	Correct line between $x = -2$ and $x = 3$	3	B3 for a correct line between $x = -2$ and $x = 3$ (B2 for a correct straight line segment through at least 3 of (−2, −2) (−1, −1.5) (0, −1) (1, −0.5) (2, 0) (3, 0.5) **or** for all of (−2, −2) (−1, −1.5) (0, −1) (1, −0.5) (2, 0) (3, 0.5) 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 positive gradient through (0, −1) **or** for a line with a gradient of 0.5)
				Total 3 marks

13	3.6 × 2.1 (= 7.56) or 0.3 × 0.3 (= 0.09) or 3.6 ÷ 0.3 (= 12) or 2.1 ÷ 0.3 (= 7)		4	M1
	"7.56" ÷ "0.09" (= 84) or "12" × "7" (= 84)			M1
	"84" ÷ 6 × 17.5(0) oe			M1 for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	245		A1
				Total 4 marks

14 (a)	(3)	(4)	**5**	**6**	For all correct values	2	B2 for all correct values (B1 for 6 or 7 correct values)
	5	**6**	(7)	**8**			
	7	**8**	**9**	(10)			
(b)						2	M1 for $\frac{m}{12}$ where $m < 12$ or $\frac{11}{n}$ where $n > 11$ or for 11:12
	Correct answer scores full marks (unless from obvious incorrect working)				$\frac{11}{12}$		A1 oe 0.91(666…) or 91(.666…)% truncated or rounded
							Total 4 marks

15	0.35 × 140 (= 49) oe or 14 + 14 + 14 + 7 (= 49) oe or $\frac{1}{4}$ of 140 (= 35) oe or 140 ÷ 4 (= 35) or 0.4 × 140 (= 56) oe		4	M1
	"49" × 6 (= 294) oe or "35" × 8 (= 280) oe or (140 – "49" – "35") × 10 (= 560) or "56" × 10 (= 560)			M1 for 1 correct
	"49" × 6 (= 294) oe **and** "35" × 8 (= 280) oe **and** (140 – "49" – "35") × 10 (= 560) or "56" × 10 (= 560)			M1 for all correct
	Correct answer scores full marks (unless from obvious incorrect working)	1134		A1 cao
				Total 4 marks

16	30 or 50		2	M1
	Working required	1500		A1 cao dep on M1 1500 must come from correct figures of 30 **and** 50
				Total 2 marks

17		Triangle with vertices (3, –1) (5, –1) (3, –4)	2	B2 for a correct reflection (B1 for a correct reflection in a vertical line or for 2 points of the correct triangle or for a correct reflection in $y = 1$) Overlay is available
				Total 2 marks

18	(a)		$10 < p \square 15$	1	B1 allow $10 \square p \square 15$ or $10 < p < 15$ or $10 \square p < 15$ or $10 – 15$
	(b)	$12.5 \times 18 + 17.5 \times 16 + 22.5 \times 14 + 27.5 \times 8 + 32.5 \times 4$ (= 1170) or 225 + 280 + 315 + 220 + 130 (= 1170) [lower bound products are: 180, 240, 280, 200, 120] [upper bound products are: 270, 320, 350, 240, 140] Sum of lower bound products = 1020 Sum of upper bound products = 1320 Sum of products using 11, 16, 21, 26 and 31 = 1080 Sum of products using 12, 17, 22, 27 and 32 = 1140 Sum of products using 13, 18, 23, 28 and 33 = 1200 Sum of products using 14, 19, 24, 29 and 34 = 1260		4	M2 for at least **4** correct products added (need not be evaluated) **or** If not M2 then award: M1 for consistent use of value within interval (including end points) for at least **4** products which must be added or correct midpoints used for at least **4** products and not added
		"1170" ÷ 60			M1 dep on at least M1 Allow division by their Σf provided addition or total under column seen
		Correct answer scores full marks (unless from obvious incorrect working)	19.5		A1 oe
					Total 5 marks

19		Fully correct angle bisector with all relevant arcs	2	B2 for a fully correct angle bisector with all arcs shown (the line and the arcs can intersect on or within the overlay guidelines) (B1 for all arcs and no angle bisector drawn or for a correct angle bisector within or on guidelines but no arcs or insufficient arcs) NB Overlay is available
				Total 2 marks

20	(a)		p^{15}	1	B1 cao
	(b)	$8n^2+6n+n^2-4n$		2	M1 for expanding with at least 3 correct terms (must see for example, $8n^2$ and not just $2n \times 4n$)(can assume that no sign in front of a number is a + if terms written in a list or table)
			$9n^2+2n$		A1 oe $2n+9n^2$ or $n(9n+2)$ or $n(2+9n)$
	(c)	e.g. $2x+5=12-3x$ or $\frac{2}{3}x+\frac{5}{3}=4-x$ oe		3	M1 for removal of fraction **and** multiplying out RHS correctly by 3 **or** separating fraction (LHS) in an equation
		e.g. $2x+3x=12-5$ or $5x=7$ or $5-12=-3x-2x$ or $-7=-5x$ or $\frac{2}{3}x+x=4-\frac{5}{3}$ oe or $\frac{5}{3}x=\frac{7}{3}$ oe			M1 ft (dep on 4 terms) correctly rearranging their 4 term equation for terms in x on one side of equation and number terms on the other
		Working required	$\frac{7}{5}$		A1 oe eg 1.4 or $1\frac{2}{5}$ dep on M2
					Total 6 marks

21	(a)		2 3 5 7	1	B1 All numbers must be present with no repeats and no other numbers. Numbers can be in any order Allow commas, colons, etc, between the numbers
	(b)		3 7	1	B1 Both numbers must be present with no repeats and no other numbers. Numbers can be in any order Allow commas, colons, etc, between the numbers
	(c)		2 4 5 6 8	1	B1 All numbers must be present with no repeats and no other numbers. Numbers can be in any order Allow commas, colons, etc, between the numbers
					Total 3 marks

22	$\pi \times 70^2 \times 18$ oe or $\pi \times 0.7^2 \times 0.18$ oe		4	M1 for use of $\pi r^2 h$
	88200π or 277 088(.472)) or 0.0882π or $\frac{441}{5000}\pi$ or 0.277(088472)			A1 Allow 276 948 – 277 200 or Allow 0.276 948 – 0.277 200
	"277 088(.472)" ÷ 1000 (= 277.088…) or $88200\pi \div 1000$ (= 88.2π or $\frac{441}{5}\pi$) "0.277(088472)" × 1000 (= 277.088…) or $88200\pi \div 1000$ (= 88.2π or $\frac{441}{5}\pi$)			M1 Allow a value for their volume which contains $\boldsymbol{\pi}$, **70** and **18** to be divided by 1000 Allow a value for their volume which contains $\boldsymbol{\pi}$, 0**.7** and **0.18** to be multiplied by 1000
	Correct answer scores full marks (unless from obvious incorrect working)	277		A1 awrt 277
				Total 4 marks

23	B1 for $2^2 \times 5^2$ oe or $2 \times 2 \times 5 \times 5$ oe or $2^2 \times 7$ oe or $2 \times 2 \times 7$ oe or $5^2 \times 7$ oe or $5 \times 5 \times 7$ oe or $2^2 \times 5 \times 7$ oe or $2 \times 2 \times 5 \times 7$ oe or $2 \times 5^2 \times 7$ oe or $2 \times 5 \times 5 \times 7$ oe or $2^2 \times 5^2 \times 7 \times 11$ or $2 \times 2 \times 5 \times 5 \times 7 \times 11$ oe or 700 or $2^p \times 5^q \times 7^r$ where two of p or q or r are correct	$2^2 \times 5^2 \times 7$	2	B2 Allow $2 \times 2 \times 5 \times 5 \times 7$ Answers must be a product of prime factors Can be in any order (allow $2^2 \cdot 5^2 \cdot 7$) Do not allow 1 in the final answer $2 \times 2 \times 5 \times 5 \times 7$ in working space and 700 on answer line award B2 $2^2 \times 5^2 \times 7$ in working space and 700 on answer line award B2 (B1 for $2^p \times 5^q \times 7^r$ where two of p or q or r are correct **or** one mistake in their product (see working on the left for examples) **or** for 700)
				Total 2 marks

24	475 × 0.16 (= 76) oe **or** 475 × (1 – 0.16) (= 399) oe		4	M1 (working for shop A)
	1 – 0.15 (= 0.85) **or** x – 0.15x = 408 **or** 100(%) – 15(%) (= 85(%)) **or** $\frac{408}{85}$ (= 4.8) oe			M1 (working for shop B)
	408 ÷ "0.85" (= 480) **or** 408 ÷ "85" × 100 (= 480) **or** 408 × 100 ÷ "85" (= 480) oe **or** "4.8" × 100 (= 480) **or** $\frac{408}{85} \times 15 (= 72)$			M1 (working for shop B)
	Working required	**A** **and** 72 and 76 seen		A1 dep on M2 for **A** with correct working (72 and 76 seen)
				Total 4 marks

25	(a)(i)	$(x\pm8)(x\pm3)$ or $x(x-3)+8(x-3)$ or $x(x+8)-3(x+8)$		2	M1 for $(x\pm8)(x\pm3)$ or $(x+a)(x+b)$ where $ab = -24$ or $a + b = 5$ and, a and b are integers
		Correct answer scores full marks (unless from obvious incorrect working)	$(x+8)(x-3)$		A1 for $(x+8)(x-3)$ Allow any letter for x Must be in the form $(x+a)(x+b)$ where a and b are integers
	(ii)		–8 and 3	1	B1 must ft from their answer in (a)(i) ft from their incorrect factors in the form $(x + a)(x + b)$ Award B0 for –8 and 3 if no marks scored in (a)(i)
	(b)	$3y-7y>-10-5$ or $5+10>7y-3y$		3	M1 allow use of = or condone incorrect inequality sign
		$-4y>-15$ or $15>4y$ or $y=\frac{15}{4}$ oe or			M1 allow use of = or condone incorrect inequality sign
		Working required	$y<\frac{15}{4}$		A1 dep on M1 oe eg $y < 3.75$ or $\frac{15}{4} > y$ or $3.75 > y$ Must have correct sign on answer line NB Sight of correct answer in working space and just $(y=)\frac{15}{4}$ oe on answer line gains M2 only
					Total 6 marks

26	(a)		0.000 084	1	B1 cao
	(b)	52×10^{145} or 5.2×10^{n} or $p \times 10^{146}$ where $1 \leq p < 10$		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	5.2×10^{146}		A1
					Total 3 marks

27	eg $51^2 = (DE)^2 + 24^2$ oe **or** $2601 = (DE)^2 + 576$ oe **or** $(DE^2 =) 51^2 - 24^2$ (= 2025) oe **or** $(DE^2 =) 2601 - 576$ (= 2025) oe **or** $\cos(DFE) = \frac{24}{51}$ **or** $\sin(DEF) = \frac{24}{51}$		5	M1 for applying Pythagoras theorem correctly
	$(DE =)\sqrt{51^2 - 24^2}$ (= $\sqrt{2025}$ = 45) **or** $(DE =)\sqrt{2601 - 576}$ (= $\sqrt{2025}$ = 45) **or** $(DFE =)\cos^{-1}\left(\frac{24}{51}\right)(= 61.9...)$ **or** $(DEF =)\sin^{-1}\left(\frac{24}{51}\right)(= 28.0...)$			M1 for square rooting
	$\frac{their\ DE}{7.5}(= 6)$ oe **or** $\frac{7.5}{their\ DE}\left(= \frac{1}{6}\right)$ **or** $\frac{x}{24} = \frac{7.5}{their\ DE}$ oe **or** tan"*their* 61.9..." $= \frac{7.5}{(x)}$ **or** tan"*their* 28.0..." $= \frac{(x)}{7.5}$ **or** $\frac{(x)}{\sin(their\ 28.0)} = \frac{7.5}{\sin(their\ 61.9)}$ NB Their *ED* or their 61.9 or their 28.0 must be clearly identified Their 61.9.. or their 28.0.. cannot be used as lengths of the triangle Their 45 cannot be used as an angle of the triangle			M1 for a correct method to find the scale factor Allow correct use of sine rule/cosine rule/Pythagoras theorem Allow 0.17 or better for $\frac{1}{6}$ **Special case** Allow $(DE =)\sqrt{51^2 + 24^2}$ $(= \sqrt{3177} = 3\sqrt{353} = 56.3...)$ for "45" for this mark
	24 ÷ "6" oe **or** $24 \times "\frac{1}{6}"$ **or** 24 × "1.67" **or** $(x =)\frac{7.5}{their\ ED} \times 24$ **or** $(x =)\frac{7.5}{\tan"their\ 61.9..."}$ oe **or** $(x =) 7.5 \times \tan"their\ 28.0..."$ oe **or** $(x =)\frac{7.5}{\sin(their\ 61.9)} \times \sin(their\ 28.0)$ oe **or** $51 \times "\frac{1}{6}"(= 8.5)$ **and** $(x =)\sqrt{8.5^2 - 7.5^2}\left(= \sqrt{16}\right)$			M1 dep on previous M1 for a correct method to find *x* or for finding *BC* **and** using Pythagoras theorem to find *x* Allow $24 \times "\frac{7.5}{56(.3...)}"$ **or** $24 \div "\frac{56(.3...)}{7.5}"$ for scale factor for this mark
	Working required	4		A1 dep on M2 The value of 4 must come from correct figures
				Total 5 marks

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