Pearson Edexcel

Mark Scheme (Results)

January 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
- 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.

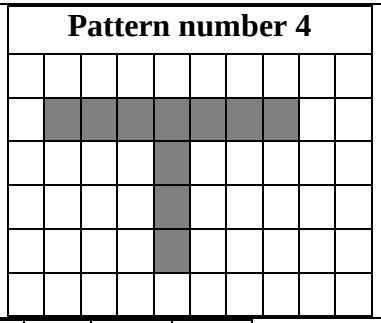
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.
- **Parts of questions**

  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 8, 12a, 12b, 15, 17 and 18 (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)		Hamlet	1	B1
(b)		Henry V and Julius Caesar	1	B1
(c)		26 450	1	B1
(d)		Twenty one thousand and fifty five	1	B1
				Total 4 marks

2	5 × 1000 (= 5000) **or** 350 ÷ 1000 (= 0.35)		4	M1
	"5000" ÷ 350 (= 14.2857…) **or** 5 ÷ "0.35" (= 14.2857…) **or** 14			M1 Allow their 5000 or their 0.35
	350 × "14" or 4900 or 0.35 × "14" or "0.49" or (14.28(57…) – 14) × 100			M1
	Correct answer scores full marks (unless from obvious incorrect working)	100 g or 0.1 kg		A1
				Total 4 marks

2 **ALT**	5 × 1000 (= 5000) **or** 350 ÷ 1000 (= 0.35)		4	M1
	350, 700, 1050, ……., 4900 **or** 0.35, 0.7, 1.05, …….., 4.9			M1 for repeated addition to at least 4900 or 4.9 (allow one error) or for repeated subtraction to at least 100 or 0.1 (allow one error)
	350, 700, 1050, ……., 4900 **or** 0.35, 0.7, 1.05, …….., 4.9			M1 for repeated addition to 4900 or 4.9 (no errors) or clearly indicated e.g. at the end of their list, circled, underlined etc or for repeated subtraction to 100 or 0.1 (no errors) clearly indicated e.g. at the end of their list, circled, underlined etc
	Correct answer scores full marks (unless from obvious incorrect working)	100 g or 0.1 kg		A1
				Total 4 marks

3	(a)		Correct shape	1	B1
	(b)	1 2 3 4 5 1 4 7 **10** **13**	10 and 13	1	B1 for 10 and 13
	(c)		22	1	B1
	(d)	10 13 16 19 22 25 28 31 34 37 40 43 or 3 × 15 – 2 (= 43) and 3 × 14 – 2 (= 40) or (42 + 2) ÷ 3 (= 14.6….)	Correct reason	1	B1 for correct reason, for e.g. 3n – 2 = 42 does not have a whole number (integer) answer/it's a decimal or 42 is a multiple of 3 or 42 is in the 3 times table or 40 and 43 are in the sequence or 40 is in the sequence and 40 + 3 does not equal 42 or its 1 less than 43
					Total 4 marks

4	(a)		80	1	B1
	(b)		thousandth	1	B1 oe e.g. 3 thousandth, 1000^{th}, $\frac{1}{1000}$ $\frac{3}{1000}$, 0.003
	(c)		0.04 0.042 0.2 0.204 0.24	1	B1
	(d)		25.79	1	B1
	(e)		36	1	B1
					Total 5 marks

5	(a)(i)		A cross at 0.5	1	B1
	(ii)		unlikely	1	B1
	(b)	<table><tr><th>Type of rice</th><th>Tally</th><th>Frequency</th></tr><tr><td>arborio</td><td>IIII</td><td>4</td></tr><tr><td>basmati</td><td>IIII</td><td>6</td></tr><tr><td>jasmine</td><td>IIII</td><td>7</td></tr><tr><td>wild</td><td>III</td><td>3</td></tr></table>		2	B2 for all frequencies correct (B1 for 2 frequencies correct or 2 tallies correct or 1 tally with its frequency correct)
					Total 4 marks

6	$\frac{1}{4} \times 600$ (= 150) oe or $\frac{3}{4} \times 600$ (= 450) oe		4	M1
	"450" × 13.60 (= 6120)			M1
	(7200 – "6120") ÷ "150" or 1080 ÷ "150"			M1
	Correct answer scores full marks (unless from obvious incorrect working)	7.2(0)		A1 SC B2 for 11.46(666…)
				Total 4 marks

7	(a)		45pk	1	B1 accept 45kp
	(b)		11e – 5f	2	B2 for 11e – 5f (B1 for 11e or –5f)
	(c)	$2d = 16 - 7$ or $2d = 9$ or $d + \frac{7}{2} = \frac{16}{2}$ oe or (16 – 7) ÷ 2 or 9 ÷ 2		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	4.5		A1 accept $\frac{9}{2}$ or $4\frac{1}{2}$
					Total 5 marks

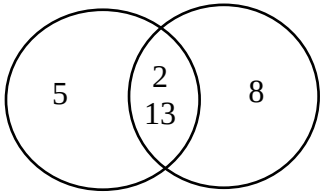
8	[6, 6.4]		4	M1 accept in the range 6 – 6.4
	"[6, 6.4]" × 80 (= [480, 512])			M1
	590 – "[480, 512]" (= [110, 78])			M1
	Working required	78 – 110		A1 dep on M1
				Total 4 marks

8 **ALT**	[6, 6.4]		4	M1 accept in the range 6 – 6.4
	(590 ÷ 80) – "[6, 6.4]" (= [0.975, 1.375]) or 7.375 – "[6, 6.4]" (= [0.975, 1.375])			M1
	"[0.975, 1.375]" × 80 (= [78, 110])			M1
	Working required	78 – 110		A1 dep on M1
				Total 4 marks

9	(a)			**Spinner A**			Correct scores	2	B2 for all scores correct (B1 for 3 or 4 scores correct)
				1	**2**	**3**			
		Spinner B	**1**	1	2	3			
			2	2	4	**6**			
			3	3	**6**	**9**			
			4	4	**8**	**12**			
	(b)						$\frac{4}{12}$	1	B1 ft oe accept 0.33(33…)
									Total 3 marks

10	$\frac{30}{100} \times 250\ (= 75)$ oe or $250 - 160\ (= 90)$		3	M1
	"90" – "75" or "75" – "90"			M1
	Correct answer scores full marks (unless from obvious incorrect working)	15		A1 allow –15
				Total 3 marks

11	<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>5</td><td>3</td><td>1</td><td>−1</td><td>−3</td><td>−5</td></tr></table> (−2, 5) (−1, 3) (0, 1) (1, −1) (2, −3) (3, −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, 5) (−1, 3) (0, 1) (1, −1) (2, −3) (3, −5) **or** for all of (−2, 5) (−1, 3) (0, 1) (1, −1) (2, −3) (3, −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 negative gradient through (0, 1) **or** for a line with a gradient of −2)
				Total 3 marks

<table>
<tr><td>12 (a)</td><td>e.g.
$\frac{21}{24}-\frac{10}{24}$ or $\frac{84}{96}-\frac{40}{96}$ or $\frac{21n}{24n}-\frac{10n}{24n}$</td><td></td><td>2</td><td>M1 for finding a common denominator of 24 or a multiple of 24 with at least one fraction correct</td></tr>
<tr><td></td><td>e.g.
$\frac{21}{24}-\frac{10}{24}=\frac{11}{24}$
$\frac{84}{96}-\frac{40}{96}=\frac{44}{96}=\frac{11}{24}$ or $\frac{21n}{24n}-\frac{10n}{24n}=\frac{11n}{24n}=\frac{11}{24}$</td><td>Shown</td><td></td><td>A1 dep on M1, for a complete method leading to $\frac{11}{24}$</td></tr>
<tr><td>(b)</td><td>2, 5, 10, 13, 26, 65 and 2, 4, 8, 16, 26, 52, 104
or
2, 5, 13 and 2, 2, 2, 2, 13 oe
 

or
<table><tr><td colspan="3">e.g.</td></tr><tr><td>26</td><td>130</td><td>208</td></tr><tr><td></td><td>5</td><td>8</td></tr></table><table><tr><td colspan="3">e.g.</td></tr><tr><td>2</td><td>130</td><td>208</td></tr><tr><td>13</td><td>65</td><td>104</td></tr><tr><td></td><td>5</td><td>8</td></tr></table></td><td></td><td>2</td><td>M1 for starting to list at least two factors of each number excluding 1 and n
(Two factors may be written as, for e.g, 130 ÷ 26 = 5 and 208 ÷ 26 = 8 oe or 130 ÷ 13 = 10 and 208 ÷ 13 = 16 etc)
or

2, 5, 13 and 2, 2, 2, 2, 13 seen
(may be in a factor tree or a ladder diagram and ignore 1)

or a fully correct Venn diagram oe

or other clear method, e.g, table</td></tr>
<tr><td></td><td>Working required</td><td>26</td><td></td><td>A1dep on M1</td></tr>
<tr><td></td><td></td><td></td><td></td><td>Total 4 marks</td></tr>
</table>

13	(a)	$18 - - 3 \times 5$ or $18 - - 15$ or $18 + 15$		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	33		A1
	(b)	$d - 10 = 3x$ oe or $-3x = -d + 10$ or $\frac{d}{3} = x + \frac{10}{3}$ oe or $\frac{d - 10}{3}$ oe		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	$x = \frac{d - 10}{3}$		A1 accept $x = \frac{d}{3} - \frac{10}{3}$ oe or $x = \frac{-d + 10}{-3}$ oe (must see x = … on answer line or in working)
					Total 4 marks

14	(a)		Correct rotation	2	B2 for a fully correct rotation at (1, 2) (3, 2) (3, 5) (B1 for the triangle in correct orientation and size or rotated 90° clockwise about the origin (–1, –2) (–3, –2) (–3, –5))
	(b)		Enlargement, scale factor 3 and (0,0)	2	B2 for enlargement, scale factor 3 and (0,0) (B1 for 2 correct from for enlargement, enlarge, etc so long as no mention of rotation, reflection or translation, flip, move etc. or SF 3, three times etc. or (0, 0) or Origin or 0 stated. Accept about, from etc. with no mention of line, or column vector.)
					Total 4 marks

15	$\frac{1}{2}\times 4.8\times 2.5\,(=6)$ oe **or** 3 × 4.8 (= 14.4) oe or 4.8 × (3 + 2.5) (= 26.4)		5	M1
	$\frac{1}{2}\times 4.8\times 2.5\,(=6)$ oe **and** 3 × 4.8 (= 14.4) oe or [4.8 × (3 + 2.5)] – [0.5 × 2.4 × 2.5 + 0.5 × 2.4 × 2.5] or "26.4" – 6 (= 20.4) or			M1
	("6" + "14.4") ÷ 1.8 (= 11.3…) or "20.4" ÷ 1.8 (= 11.3…) or $\frac{"6"}{1.8}+\frac{"8"}{1.8}\left(3.3...+8=11.3...\right)$			M1 dep on M1 for a method to find the number of tins for their area
	"12" × 16.4(0) (= 196.8(0)) or 190 ÷ 16.4 (=11.58…) and "12"			M1 dep on previous M1 for a method to calculate the cost for their number of tins (their number of tins must be rounded up to the next integer) or the number of tins that can be bought compared with their number of tins
	Working required	No and 196.8(0) or 11.58 and 12 seen		A1 dep on M2 SC B1 for 190 ÷ 16.4(0) if M0 scored
				Total 5 marks

16	$6 \times 11 + 18 \times 25 + 30 \times 23 + 42 \times 15 + 54 \times 6$ (= 2160) **or** 66 + 450 + 690 + 630 + 324 (= 2160) [lower bound products are: 0, 300, 552, 540, 288] [upper bound products are: 132, 600, 828, 720, 360]		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
	"2160" ÷ "80"			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)	27		A1
				Total 4 marks

17	$6-12x$ or $2-4x=\frac{5}{3}-\frac{8}{3}x$		3	M1 for expansion of bracket on the LHS or dividing the RHS by 3 with two terms
	$6-5=12x-8x$ or $1 = 4x$ or $-12x+8x=5-6$ oe or $-4x = -1$ or $\frac{8}{3}x-4x=\frac{5}{3}-2$ oe or $2-\frac{5}{3}=-\frac{8}{3}x+4x$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation; number terms on the other
	Working required	$\frac{1}{4}$		A1 oe dep on M1 awarded
				Total 3 marks

18	**Two pairs** of intersecting arcs with equal radii centre A and B		2	M1 for arcs that intersect within or on the guidelines **or** correct perpendicular bisector without arcs.
	Working required	Bisector with construction arcs		A1 for a fully correct bisector with two intersecting arcs
				Total 2 marks

19	3 × 180 (= 540) or 360 – [(180 – 90) + (180 – 135) + (180 – 67) + (180 – 119)] (= 51) or 360 – (90 + 45 + 113 + 61) (= 51)		3	M1
	90 + 135 + 67 + 119 + x = “540” oe 411 + x = “540” oe or “540” – (90 + 135 + 67 + 119) or 3 × 180 – (90 + 135 + 67 + 119) oe or 540 – 411 or 180 – “51” oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	129		A1
				Total 3 marks

20	2 : 3 : 15 oe or 20 or (1 : 5) × 3 or (1 : 5 =) 3 : 15 or 2n : 3n : 15n e.g. 4 : 6 : 30 or G(reen) = 2, O(range) = 3 , Y(ellow) = 15		3	M1
	$\frac{2}{"20"}$ ′ 280 oe or 14 × 2 or $\frac{2}{"2"+"3"+"15"}$ ′ 280 oe or $\frac{2n}{"2n"+"3n"+"15n"}$ ′ 280 oe			M1
	Correct answer scores full marks (unless from obvious incorrect working)	28		A1 or 28 : 42 : 210 or 28 , 42 , 210 If not in this order must be labelled correctly
				Total 3 marks

21	(a)	18 000 + 14 × 1160 (= 34 240) oe or 18 000 + 16 240 (= 34 240)		4	M1
		"34 240" – 32 000 (= 2240) or $\frac{"34\,240"}{32\,000}$ (= 1.07)			M1
		$\frac{"2240"}{32\,000}(\times 100)$ or $\frac{"34\,240"}{32\,000}\times 100$ (= 107) or "1.07" – 1 (= 0.07)			M1
		Correct answer scores full marks (unless from obvious incorrect working)	7		A1
	(b)	e.g. 1 − 0.15 (= 0.85) or 100(%) − 15(%) (= 85(%))		3	M1
		e.g. 39 865 ÷ 0.85 or 39 865 ÷ 85 × 100 oe			M1
		Correct answer scores full marks (unless from obvious incorrect working)	46 900		A1
					Total 7 marks

22	1 – (0.24 + 0.4) (= 0.36) oe or 3x + x = 1 – (0.24 + 0.4) oe		4	M1
	48 ÷ 0.24 (= 200) or "0.36" ÷ 4 (= 0.09) or "0.36" ÷ 4 × 3 (= 0.27)			M1
	"0.27" × "200" or "200" × "0.36" ÷ 4 × 3 ("200" – 48 – "80") ÷ 4 × 3			M1 for a complete method
		54		A1
				Total 4 marks

22 **ALT**	1 – (0.24 + 0.4) (= 0.36) oe or 3x + x = 1 – (0.24 + 0.4) oe		4	M1
	48 ÷ 24 (= 2) oe or $\left(\frac{"0.36"}{4}\times 3\right)\div 0.24\left(=\frac{9}{8}=1.125\right)$ oe or $\left(\frac{"36"}{4}\times 3\right)\div 24\left(=\frac{9}{8}=1.125\right)$ oe			M1
	$"2"\times\left(\frac{"36"}{4}\times 3\right)$ oe or $"\frac{9}{8}"\times 48$ oe or $("27"\div 24)\times 48$ oe			M1 for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	54		A1
				Total 4 marks

23	$\cos 50 = \frac{18}{(AB)}$ or $\sin 40 = \frac{18}{(AB)}$ or $\frac{(AB)}{\sin 90} = \frac{18}{\sin 40}$		5	M1	M2 for $(AB =)\sqrt{18^2 + (18\tan 50)^2}$ oe (= 28.0030…) or 28
	$(AB =)\frac{18}{\cos 50}(= 28.0030...)$ oe or 28 or $(AB =)\frac{18}{\sin 40}(= 28.0030...)$ oe or 28			M1	
	$\frac{1}{2} \times \pi \times "28.0030..."(= 43.9...)$ oe or 44 $\pi \times "28.0030..."(= 87.9...)$ oe or 88			M1 for use of πd or $\frac{1}{2}\pi$d oe Allow any value of AB > 18 if M2 not scored	
	"28…" + "43.9…" (= 71.9900…) or "28" + "44"			M1ft from previous M1 Allow their d + their $\frac{1}{2}\pi$d	
	Correct answer scores full marks (unless from obvious incorrect working)	72		A1 awrt 72	
				Total 5 marks	

24	(a)		0.000 625	1	B1
	(b)	25 000 000 oe e.g. 25×10^6 or 0.25×10^8 **or** 2.5×10^n $n \neq 7$		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	2.5×10^7		A1
					Total 3 marks

25	(a)	$(y \pm 6)(y \pm 8)$ or $y(y+6)-8(y+6)$ or $y(y-8)+6(y-8)$		2	M1 or for $(y \pm a)(y \pm b)$ where $ab = -48$ or $a + b = -2$
			$(y+6)(y-8)$		A1 oe Allow any letter for y
	(b)		$x \leq 3$	1	B1 allow $3 \geq x$ Allow any letter for x
	(c)	$6-14>12w-7w$ oe or $7w-12w>14-6$ oe		3	M1 Condone = rather than > or any other sign for this mark.
		$-8>5w$ or $-5w>8$ or $-w>\frac{8}{5}$ or $w>-\frac{8}{5}$ or $w=-\frac{8}{5}$ oe			M1 Condone = rather than > or any other sign for this mark.
		Correct answer scores full marks (unless from obvious incorrect working)	$w<-\frac{8}{5}$		A1 oe accept $-\frac{8}{5}>w$ Must have correct sign on answer line dep on M1 (sight of correct answer in working space and just $(w=)-\frac{8}{5}$ oe on answer line gains M2 only)
					Total 6 marks

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