Pearson Edexcel

Mark Scheme (Results)

January 2023

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

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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.

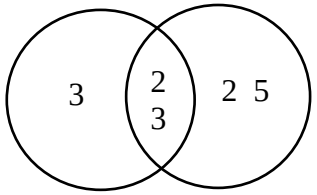
International GCSE Maths				
Apart from Question 21, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	**Working**	**Answer**	**Mark**	**Notes**
1 (a)		15	1	B1
(b)		18	1	B1
(c)		16	1	B1
(d)		2	1	B1
(e)		8 and 18	1	B1
				Total 5 marks

2 (a)		Unlikely	1	B1	Tick at
(b)		Evens	1	B1	Tick at
(c)		Impossible	1	B1	Tick at
					Total 3 marks

3 (a)		Prism	1	B1	Accept pentagon(al) prism
(b) (i)		7	1	B1	
(ii)		10	1	B1	
(c)	±(70 − 8 × 5) or − 30 or 70 − 5 − 5 − 5 − 5 − 5 − 5 − 5 − 5 oe		2	M1	Could be done in 2 parts
	Correct answer scores full marks (unless from obvious incorrect working)	30		A1	
					Total 5 marks

4	(a)		$9y$	1	B1
	(b)		$12p^2$	1	B1
	(c)		6	1	B1
	(d)		-1	1	B1
	(e)		$6c + 2d$	2	B2 for $6c + 2d$ or $2d + 6c$ (B1 for $6c$ or $2d$)
					Total 6 marks

5	15 – 6.90 (= 8.10) or 1500 – 690 (= 810)		3	M1
	"8.10" ÷ 0.55 (= 14.727…) or "810" ÷ 55 (= 14.727…) or 15			M1
	Correct answer scores full marks (unless from obvious incorrect working)	14		A1
				Total 3 marks

<table>
<tr><td>6 (a)</td><td></td><td>1, 2, 5, 10</td><td>1</td><td>B1</td><td>in any order</td></tr>
<tr><td></td><td>(b)</td><td>18, 36, … and 60, 120, …
or
2 3 3 oe
or
2 2 3 5 oe
or
 

or
<table><tr><td>2</td><td>18</td><td>60</td></tr><tr><td>3</td><td>9</td><td>30</td></tr><tr><td>5</td><td>3</td><td>10</td></tr><tr><td></td><td></td><td>2</td></tr></table>or

2, 2, 3, 3, 5 oe</td><td></td><td>2</td><td>M1</td><td>for any correct valid method and no errors e.g.

for starting to list at least two multiples of each number

or

2 3 3 seen

or

2 2 3 5 seen

(may be in a factor tree or a ladder diagram and ignore 1)

or

a fully correct Venn diagram

or

other clear method, e.g, table, not be written as a product</td></tr>
<tr><td></td><td>Working required</td><td>180</td><td></td><td>A1</td><td>accept $2^2 \times 3^2 \times 5$ oe</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>Total 3 marks</td></tr>
</table>

7	(a)		0.405, 0.45, 0.5, 0.504, 0.54	1	B1
	(b)		8	1	B1
	(c)		$3\frac{4}{9}$	1	B1
	(d)	0.28 or $\frac{22}{25}$ or $\frac{\frac{7}{25}+0.88}{2}$ oe		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	0.58		A1 oe eg $\frac{29}{50}$
					Total 5 marks

8	(a)		**apple pie**	**fruit**	**ice cream**	**Total**	3	B3 Fully correct table If not B3, then B2 for 4 or 5 correct B1 for 2 or 3 correct
		Year 5			8	36		
		Year 6	34	8				
		Total		14	10			
	(b)	$\frac{22}{80}$					2	M1
						$\frac{11}{40}$		A1
								Total 5 marks

9	(*ABD* =) 360 – 52 – 112 – 90 (= 106)		4	M1	may be marked in correct place on diagram
	(*CBD* =) 180 – "106" (=74)			M1	may be marked in correct place on diagram
		32		A1	
		Reasons given		B1	dep on M1 At least two appropriate reasons given. "angles in a quadrilateral add to 360°" accept 4-sided shape. "angles on a straight line add to 180°" **or** angles on a straight line add to 180° "angles in a triangle add to 180°" **or** angles in a triangle sum to 180° "base angles in an isosceles triangle (are equal)"
					Total 4 marks

10			240	1	B1	Accept 235 - 245
			58	1	B1	Accept 58 -59
	e.g. 950 ÷ 6 or 950 ÷ $\frac{240}{40}$ oe or 50 × 3 + 8	e.g. 170 × 6 or 170 × $\frac{240}{40}$ oe or 300 × 2 + 420		2	M1	for a correct method that gives the exchange for 950 Danish krone to dollars or 170 dollars to Danish krone
	(1 dollar = 6 krone)					
	Working required		All figures accurate eg 950 Danish krone = 150 - 165 dollars (or clearly showing 170 is enough) or 170 dollars = 1000 - 1040 Danish krone (or clearly showing that 950 is less than 170 dollars) oe		A1	
						Total 4 marks

11	(a)	0.48031(4...) + 0.45555(5...) **or** $\frac{61}{127}+\frac{41}{90}$		2	M1	Evaluate either fraction correctly as a decimal to at least 5 sf (rounded or truncated) or as a simplified fraction or an answer of 0.935, 0.936, 0.9358 or 0.9359
		Correct answer scores full marks (unless from obvious incorrect working)	0.93587(05162)		A1	Correct to at least 5 sf (rounded or truncated)
	(b)		0.936	1	B1	ft if at least 4 sf given in (a)
						Total 3 marks

12	(a)	(T =) 2.5 × 12 (+) 1.5 × 5		2	M1	
		Correct answer scores full marks (unless from obvious incorrect working)	37.5		A1	Accept 38 with working shown
	(b)	55 = 2.5d + 1.5 × 8 **or** 55 – 1.5 × 8 (= 43) **or** 55 – 12 (= 43)		3	M1	Form a correct equation **or** subtract time taken for bus stops from 55
		2.5d = 55 – 1.5 × 8 oe **or** 2.5d = 43 oe **or** "43" ÷ 2.5 oe			M1	Isolate term in d in a correct equation **or** a correct calculation for journey length
		Correct answer scores full marks (unless from obvious incorrect working)	17.2		A1	
						Total 5 marks

13	2.4 ÷ 0.4 (= 6**)** or 240 ÷ 40 (= 6) or 10 ÷ 0.4 (= 25) or 1000 ÷ 40 (= 25) or 40 × 40 × 40 (= 64 000) or 0.4 × 0.4 × 0.4 (= 0.064) or 1000 × 240 × 240 (= 57 600 000) or 10 × 2.4 × 2.4 (= 57.6) oe		3	M1	could show the number of boxes along the edge of a container – award marks if this is unambiguous.
	"6" × "6" × "25" oe or "57 600 000" ÷ "64 000" or "57.6" ÷ "0.064" oe			M1	fully correct method to find greatest number of boxes
	Correct answer scores full marks (unless from obvious incorrect working)	900		A1	
					Total 3 marks

14	(a)		121	1	B1	Accept 119 – 123
	(b)	Stating 6.5cm **or** an arc with centre *T*, radius 6.5 cm		3	B1	
		Line drawn or × from *S*, with a bearing of 084°			B1	
			B correctly indicated		B1	See overlay
						Total 4 marks

15	(a)		$48 < S \leqslant 54$	1	B1	Allow 48 – 54 oe
	(b)	(33 × 4) + (39 × 14) + (45 × 18) + (51 × 19) + (57 × 5) or 132 + 546 + 810 + 969 + 285 (= 2742) [lower bound products are: 120, 504, 756, 912, 270] [upper bound products are: 144, 588, 864, 1026, 300]		4	M2	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
		$\frac{"2742"}{60}$			M1	dep on M1 Allow division by their Σf provided addition or total under column seen
		Correct answer scores full marks (unless from obvious incorrect working)	45.7		A1oe	$45\frac{7}{10}$ or $\frac{457}{10}$ (accept 46 from correct working)
						Total 5 marks

16			3	M1	For area of 2 different faces (ie not 2 triangles)
	0.5 × 4.8 × 3.6 (= 8.64) oe or 4.8 × 3.6 if clear intention for this to be 2 triangles 7 × 3.6 (= 25.2) 7 × 4.8 (= 33.6) 7 × 6 (= 42) (**all measurements with intention to add**)			M1	For adding together 5 areas , at least 4 of which are correct NB: (3.6 + 4.8 + 6) × 7 (= 100.8) is 3 faces
	Correct answer scores full marks (unless from obvious incorrect working)	118		A1	118.1 or 118.08
					Total 3 marks

17		(x =) 3	3	B1	
		(y =) 6		B1	
		(z =) 10		B1	
					Total 3 marks

18	(a)		w^9	1	B1	
	(b)		$10m^7p^3$	2	B2	(B1 for 2 terms correct as part of a product)
						Total 3 marks

19	1600×0.16 (= 256) oe or $1 - 0.16$ (= 0.84) oe		4	M1	
	$1600 -$ "256" or $1600 \times$ "0.84" (= 1344)			M1	
	$\frac{"1344"}{1400}(=0.96)$ **or** $\frac{1400-"1344"}{1400}(=0.04)$ **or** $\frac{"1344"}{1400}\times 100(=96)$ **or** $\frac{1400-"1344"}{1400}\times 100$			M1	
	Correct answer scores full marks (unless from obvious incorrect working)	4		A1	SCB1 for 1856 seen if no other marks awarded
					Total 4 marks

20	390 ÷ (8 – 2) (= 65) or $\frac{8}{15}-\frac{2}{15}=390$ or $\frac{8}{15}x-\frac{2}{15}x=390$ or $\frac{6}{15}=390$ or $\frac{6}{15}x=390$ oe		3	M1	M2 for $\frac{390\times15}{6}$ oe
	"65" × (2 + 5 + 8) oe or $\frac{1}{15}=65$ or $\frac{1}{15}x=65$ or $\frac{1}{5}=195$ or $\frac{1}{5}x=195$			M1	or for 975 seen with further work and a different answer
	Correct answer scores full marks (unless from obvious incorrect working)	975		A1	SCB1 for 52, 130, 208 or 390, 975, 1560 (or 2925) or 97.5, 243.75, 390 (or 731.25)
					Total 3 marks

21	eg $4x + 8y = 60$ or $3x + 6y = 45$ $-\ \underline{4x - 6y = 4}$ $+\ \underline{4x - 6y = 4}$ $(14y = 56)$ $(7x = 49)$ eg $4x - 6\left(\frac{15 - x}{2}\right) = 4$ or $4(15 - 2y) - 6y = 4$ oe		3	M1	Correct method to eliminate x or y: coefficients of x or y the same **and** correct operator to eliminate selected variable (condone any one arithmetic error in multiplication) **or** correctly writing x or y in terms of the other variable and correctly substituting.
	eg $x + 2 \times 4 = 15$ or $7 + 2 \times y = 15$			M1	dep correct method to find second variable using their value from a correct method to find first variable or for repeating above method to find second variable.
	Working required	$x = 7$, $y = 4$		A1	dep on M1
					Total 3 marks

22	(a)		0.000 0932	1	B1	
	(b)		2.4×10^5	2	B2	If not B2, then B1 for 240 000 or 24×10^4 oe or 2.4×10^a $a \neq 5$
	(c)		1.8×10^{121}	2	B2	If not B2, then B1 for 18×10^{120} or 1.8×10^b $b \neq 121$
						Total 5 marks

23	(a)		$3c^2(6cd^2-7)$	2	B2	fully correct **or** B1 for a correct partial factorisation with at least two terms outside the bracket ie $3c(6c^2d^2-7c)$ or $c^2\left(18cd^2-21\right)$ **or** the fully correct factor outside the bracket with two terms inside the bracket and at most one mistake $3c^2(.....)$
	(b) (i)	eg $(y\pm6)(y\pm3)$ or $y(y + 3) – 6(y + 3)$ or $y(y – 6) + 3(y – 6)$		2	M1	or $(y + a)(y + b)$ where $ab = −18$ **or** $a + b = –3$ or factorisation which expands to give 2 out of 3 correct terms
		[allow use of x rather than y]	$(y-6)(y+3)$		A1	
	(ii)		$6, -3$	1	B1	ft must come from their factors in (b)(i)
						Total 5 marks

24	$\frac{1}{2}\times 7\times h = 42$ oe or $(h=)\frac{42\times 2}{7}$ (= 12) oe or $3.5^2 + h^2 = y^2$ or $h = \sqrt{y^2 - 3.5^2}$ oe		4	M1	A correct equation involving the height or a correct expression for height – could be in terms of *y*
	$y^2 = \left(\frac{7}{2}\right)^2 + ("12")^2$ oe or $\frac{1}{2}\times 7\times "\sqrt{y^2 - 3.5^2}" = 42$ oe			M1	(indep) use of *their* height (any found value that they have called 'height')
	$y = \sqrt{\left(\frac{7}{2}\right)^2 + ("12")^2}$ oe			M1	**all values must come from a correct method**
	Correct answer scores full marks (unless from obvious incorrect working)	12.5		A1	oe eg $\frac{25}{2}$
					Total 4 marks

25	$\sin 52 = \frac{12 \div 2}{r}$ oe **or** $\frac{r}{\sin 90} = \frac{6}{\sin 52}$ oe **or** $\cos(90-52) = \frac{12 \div 2}{r}$ oe **or** $(r^2 =)(12 \div 2)^2 + \left(\frac{12 \div 2}{\tan 52}\right)^2$ oe $\left[r^2 = 6^2 + 4.687...^2\right]$ **or** $\frac{r}{\sin 38} = \frac{12}{\sin 104}$ oe		4	M1	A correct trig statement for the radius use of tan must also include a correct Pythagoras statement.
	$r = \frac{6}{\sin 52}$ (=7.614) oe **or** $r = \frac{6}{\cos 38}$ oe **or** $(r =)\sqrt{(12 \div 2)^2 + \left(\frac{12 \div 2}{\tan 52}\right)^2}$ $\left[r = \sqrt{6^2 + 4.687...^2}\right]$ oe **or** $\frac{12 \sin 38}{\sin 104}$ oe			M1	A correct method to find the radius of the circle use of tan must also use Pythagoras to find an expression for r
	(Area =) $\pi \times ("7.61...")^2$			M1	the radius must come from a completely correct method
	Correct answer scores full marks (unless from obvious incorrect working)	182		A1	Accept 181 - 183
					Total 4 marks