



# Mark Scheme (Results)

Summer 2022

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
- eoo – 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 6b, 9, 11, 18, 20b and 21a (where the mark scheme states otherwise), the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

<b>Q</b>	<b>Working</b>	<b>Answer</b>	<b>Mark</b>	<b>Notes</b>
<b>1</b> (a)		Gazientep	1	B1
(b)		Two thousand, five hundred and thirty four	1	B1
(c)		2350	1	B1 cao
(d)		608	1	B1 Accept -608
(e)		4	1	B1 cao
				<b>Total 5 marks</b>

<b>2</b> (a)		$8a$	1	B1 cao
(b)		$24b$	1	B1 cao
(c)		27	1	B1 cao
				<b>Total 3 marks</b>

<b>3</b> (a)(i)		C	1	B1 cao
(ii)		A	1	B1 cao
(b)		Correct reason	1	B1 e.g. for probability cannot be more than 1 oe It adds to 1 oe Scale goes to 1 oe It has to be below 1 oe
				<b>Total 3 marks</b>

<b>4</b>	(a)		Pentagon	1	B1
	(b)		Marked at 360	1	B1
	(c)		1 45	1	B1 oe e.g. 1345, quarter to two/2 Ignore any am or pm
	(d)		centimetres	1	B1 or cm
					<b>Total 4 marks</b>

<b>5</b>	(a)(i)		6 or 8	1	B1 allow 6 and 8
	(ii)		27	1	B1 cao
	(iii)		25	1	B1 cao
	(iv)		3 or 7 or 11	1	B1 allow two or more of 3, 7, 11
	(b)	$(2^2 + 5) \times (2 + 3^2) = 99$	Two correct pairs of brackets	1	B1 cao
					<b>Total 5 marks</b>

<b>6</b>	(a)(i)		132	1	B1 cao
	(ii)		correct reason	1	B1 for <u>angles</u> on a straight <u>line</u> add up to 180 Accept angles on a straight <u>line</u> add up to 180
	(b)	$180 \div 3 (= 60)$		3	M1 or for an angle of 60 in the triangle
		$360 - (105 + 125 + "60")$			M1 for a correct complete method
			70		A1
					<b>Total 5 marks</b>

7	$6 \times 220 (= 1320)$ or $220 + 220 + 220 + 220 + 220 + 220 (= 1320)$ oe		4	M1 Allow a <b>correct</b> build-up method
	$5000 - "1320" (= 3680)$ or $5000 - ("220 + 220 + 220 + 220 + 220 + 220") (= 3680)$ oe or $5000 - 140 (= 4860)$ or $5000 - ("1320" + \text{some multiples of } 295)$ oe			M1 Allow a <b>correct</b> build-up method
	$("4860" - "1320") \div 295$ or $"3540" \div 295$ or $("3680" - 140) \div 295$			M1 Allow a <b>correct</b> build-up method
		12	A1	M1 A1 for $3680 \div 295$ $(= 12.4(745..))$ and 12
				<b>Total 4 marks</b>

8	(a)		$7g - 2e$	2	B2 or $-2e + 7g$ If not B2 then award B1 for $7g$ or $-2e$
	(b)	$3 \times 12 (= 36)$ and $5 \times 4 (= 20)$		2	M1
			16		A1 SC B1 for an answer of 56 or -16
	(c)	$4p = 24 - 9$ or $4p = 15$ or $p + \frac{9}{4} = \frac{24}{4}$ oe or $(24 - 9) \div 4$ or $15 \div 4$		2	M1 for a correct first step <b>or</b> for a calculation for $p$
			$\frac{15}{4}$		A1 oe e.g. 3.75 or $3\frac{3}{4}$
					<b>Total 6 marks</b>

<b>9</b>	Allow Triangle drawn with intersecting arcs 6 cm from <i>B</i> and 9 cm from <i>A</i>	Triangle drawn with correct intersecting arcs 6 cm from <i>A</i> and 9 cm from <i>B</i>		B2 for triangle drawn with correct intersecting arcs 6 cm from <i>A</i> and 9 cm from <i>B</i> within the overlay (B1 for two intersecting arcs within the overlay <b>or</b> accurate triangle drawn with no arcs)
				<b>Total 2 marks</b>

<b>10</b>	(i)		$\frac{7}{20}$	1	B1 oe
	(ii)	$\frac{2+6}{20}$ oe or $1 - \frac{5+7}{20}$ oe		2	M1 ft their (i)
			$\frac{8}{20}$		A1 oe penalise incorrect notation only once
					<b>Total 3 marks</b>



11	$0.85 \times 1000 (= 850)$ or $360 \div 1000 (= 0.36)$		4	M1 for a correct conversion of kg to g or g to kg
	$360 \div 15 (= 24)$ or $"0.36" \div 15 (= 0.024)$ or $"850" \div 38 (= 22.368\dots)$ or $0.85 \div 38 (= 0.022368\dots)$ or $"850" \div 360 (= \frac{85}{36} = 2.3(6\dots))$ or $\left(\frac{38}{15}\right)2\frac{8}{15}(= 2.5\dots)$			M1 oe
	$360 \div 15 (= 24)$ and $"850" \div 38 (= 22.368\dots)$ or $"0.36" \div 15 (= 0.024)$ and $0.85 \div 38 (= 0.022368\dots)$ or $360 \div 15 (= 24)$ and $"850" \div 24 (= 35.4\dots)$ or $"0.36" \div 15 (= 0.024)$ and $0.85 \div '0.024' (= 35.4\dots)$ or $"850" \div 360 (= \frac{85}{36} = 2.3(6\dots))$ and $"2.3(6\dots)" \times 15 (= 35.4)$ or $\left(\frac{38}{15}\right)2\frac{8}{15}(= 2.5\dots)$ and $"2\frac{8}{15}" \times "0.36" (= 0.912)$ or $\left(\frac{38}{15}\right)2\frac{8}{15}(= 2.5\dots)$ and $"2\frac{8}{15}" \times 360 (= 912)$ or $360 \div 15 (= 24)$ and $"24" \times 38 (= 912)$ or $"0.36" \div 15 (= 0.024)$ and $"0.024" \times 38 (= 0.912)$			M1 calculations that compare the same amounts e.g. How much flour is needed for recipe and how much Johan has for each cake  or Working out how many cakes Johann can make with his flour to compare with 38 cakes or Working out how much flour is needed to enable comparison with given figure of 0.85 kg
		No and correct figures seen		A1 No or statement that clearly states that there is not enough flour to make 38 cakes and correct figures - figures may be rounded in working and produce slightly different results which are acceptable eg $"2.3(6\dots)" \times 15$ allow 34 – 36 Must compare 912 with 850 or implied by 62 seen
				<b>Total 4 marks</b>

<b>11 ALT</b>	$0.85 \times 1000 (= 850)$		4	M1
	E.g. $15 + 15 (= 30)$ or $15 \div 2 (= 7(.5)$ or 8)			M1
	E.g. $15 + 15 + 7(.5) (= 37(.5))$ or $15 + 15 + 8 (= 38)$			M1
		No and 37(.5) or 38 seen		A1 oe No and 37(.5) or 38 seen
				<b>Total 4 marks</b>

<b>11 ALT</b>	$0.85 \times 1000 (= 850)$		4	M1																		
	$360 \div 15 (= 24)$			M1																		
	E.g. for a build up method <table border="1" style="margin-left: 40px;"> <tr><td>(360)</td><td>15</td></tr> <tr><td>(360)</td><td>15</td></tr> <tr><td>(24)</td><td>1</td></tr> <tr><td>(24)</td><td>1</td></tr> <tr><td>(24)</td><td>1</td></tr> <tr><td>(24)</td><td>1</td></tr> <tr><td>(24)</td><td>1</td></tr> <tr><td>(24)</td><td>1</td></tr> <tr><td>(864)</td><td>36</td></tr> </table>	(360)	15	(360)	15	(24)	1	(24)	1	(24)	1	(24)	1	(24)	1	(24)	1	(864)	36			M1
(360)	15																					
(360)	15																					
(24)	1																					
(24)	1																					
(24)	1																					
(24)	1																					
(24)	1																					
(24)	1																					
(864)	36																					
		No and 36 seen		A1 oe No and 36 seen																		
				<b>Total 4 marks</b>																		

12	(a)	$(0 \times 6) + (1 \times 5) + (2 \times 4) + (3 \times 7) + (4 \times 3) (= 46)$ or $0 + 5 + 8 + 21 + 12 (= 46)$		3	M1 for at least 4 products added or intention to add (need not be evaluated)
		'46' $\div$ 25			M1 dep on M1
			1.84		A1 SC B1 for answer only of 2.08 oe
	(b)		0.61	1	B1 oe 61% or $\frac{61}{100}$ oe
					<b>Total 4 marks</b>

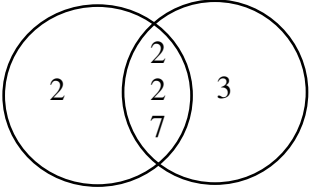
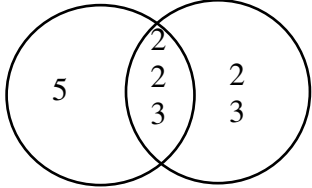
13	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td><math>x</math></td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td><math>y</math></td> <td>5</td> <td>3</td> <td>1</td> <td>-1</td> <td>-3</td> <td>-5</td> <td>-7</td> </tr> </table>	$x$	-1	0	1	2	3	4	5	$y$	5	3	1	-1	-3	-5	-7	Correct line between $x = -1$ and $x = 5$	3	<p>B3 for a correct line between <math>x = -1</math> and <math>x = 5</math></p> <p>(B2 for a correct straight line segment through at least 3 of <math>(-1, 5)</math> <math>(0, 3)</math> <math>(1, 1)</math> <math>(2, -1)</math> <math>(3, -3)</math> <math>(4, -5)</math> <math>(5, -7)</math>)</p> <p><b>or</b></p> <p>for all of <math>(-1, 5)</math> <math>(0, 3)</math> <math>(1, 1)</math> <math>(2, -1)</math> <math>(3, -3)</math> <math>(4, -5)</math> <math>(5, -7)</math> plotted but not joined)</p> <p>(B1 for at least 2 correct points stated (may be in a table) <b>or</b> plotted <b>or</b> for a line drawn with a negative gradient through <math>(0, 3)</math> <b>or</b> for a line with a gradient of <math>-2</math>)</p>
	$x$	-1	0	1	2	3	4	5												
$y$	5	3	1	-1	-3	-5	-7													
$(-1, 5)$ $(0, 3)$ $(1, 1)$ $(2, -1)$ $(3, -3)$ $(4, -5)$ $(5, -7)$			<b>Total 3 marks</b>																	

<b>14</b>	(a)	$\frac{10.1}{39.8} \times 100$ oe or $\frac{10\,100\,000}{39\,800\,000} \times 100$		2	M1
			25.4		A1 awrt
	(b)	$\frac{21}{100} \times 59.9 (= 12.579)$ oe or $\frac{21}{100} \times 59\,900\,000 (= 12\,579\,000)$ oe		3	M1
		$59.9 + "12.579" (= 72.479)$ or $59\,900\,000 + 12\,579\,000 (= 72\,479\,000)$			M1
			72		A1 Accept 72 – 73 or 72 000 000 – 73 000 000
					<b>Total 5 marks</b>

<b>15</b>		$48 \div 4 (= 12)$		4	M1 could be on diagram
		$30 - "48 \div 4" (= 18)$ or 9			M1 allow 9 on correct side of the triangle on the diagram
		$3 \times "18" + "12"$ or $6 \times "18 \div 2" + "12"$ or "54" + "12"			M1 for a complete correct method
			66		A1
					<b>Total 4 marks</b>

<b>16</b> (a)			2	M1 for $4n + k$ ( $k \neq -3$ ) or $4 \times n + k$ ( $k \neq -3$ ) or $n \times 4 + k$ ( $k \neq -3$ ) ( $k$ may be zero or absent)
		$4n - 3$		A1 oe e.g. $1 + (n - 1)4$ oe or $4 \times n - 3$ oe or $n \times 4 - 3$ oe NB: award full marks for eg $x = 4n - 3$ oe or $x = 4 \times n - 3$ oe or $x = n \times 4 - 3$ oe or $n$ th term = $4n - 3$ oe or $n$ th term = $4 \times n - 3$ oe or $n$ th term = $n \times 4 - 3$ oe but only M1 for $n = 4n - 3$ oe
(b)		$6m + 5$	1	B1 for $3(2m) + 5$ oe or $6m + 5$ or $3 \times 2m + 5$ oe or $6 \times m + 5$ Allow $3(2n) + 5$ or $6n + 5$ oe
				<b>Total 3 marks</b>

17	$1 - (0.26 + 0.18) (= 0.56)$ oe or $0.28$ oe or $x + x = 1 - (0.26 + 0.18)$ oe		4	M1 0.28 oe may be seen in the table
	$45 \div 0.18 (= 250)$ oe or $\frac{45}{18} (= 2.5)$ oe $\frac{"0.56"}{2} \div 0.18 \left( = \frac{14}{9} = 1.55\dots \right)$ oe or $\frac{"56"}{2} \div 18 \left( = \frac{14}{9} = 1.55\dots \right)$			M1
	$"250" \times \frac{"0.56"}{2}$ oe or $2.5 \times \frac{"56"}{2}$ oe or $"250" \times "0.28"$ oe or $"0.28" \div 0.18 \times 45$ oe or $"\frac{14}{9}" \times 45$ oe or $"28" \div 18 \times 45$ oe or $\frac{45}{18} \times "28"$ oe			M1
		70		A1 ( $\frac{70}{250}$ scores M3A0)
				<b>Total 4 marks</b>

<p><b>18</b> (a)</p>	<p>1, 2, 4, 7, 8, 14, 28, 56 <b>and</b> 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84</p> <p><b>or</b> 2 2 2 7 <b>and</b> 2 2 3 7</p> <p><b>or</b></p>  <table border="1" data-bbox="819 344 1048 459"> <tr> <td colspan="3">e.g.</td> </tr> <tr> <td>28</td> <td>56</td> <td>84</td> </tr> <tr> <td></td> <td>2</td> <td>3</td> </tr> </table>	e.g.			28	56	84		2	3		2	<p>M1 for any correct valid method and no errors e.g.</p> <p>for starting to list at least <b>four</b> different factors of each number and no errors</p> <p><b>or</b> 2 2 2 7 <b>and</b> 2 2 3 7 seen (may be in a factor tree or a ladder diagram and ignore 1)</p> <p><b>or</b> a fully correct Venn diagram</p> <p><b>or</b> other clear method, e.g, table</p>						
e.g.																			
28	56	84																	
	2	3																	
		28		A1 dep M1 accept $2^2 \times 7$ oe															
<p>(b)</p>	<p>60, 120, 180, 240... <b>and</b> 72, 144, 216, 288...</p> <p><b>or</b> 2 2 3 5 <b>and</b> 2 2 2 3 3</p> <p><b>or</b></p>  <table border="1" data-bbox="819 767 1048 962"> <tr> <td>2</td> <td>60</td> <td>72</td> </tr> <tr> <td>2</td> <td>30</td> <td>36</td> </tr> <tr> <td>3</td> <td>15</td> <td>18</td> </tr> <tr> <td>2</td> <td>5</td> <td>6</td> </tr> <tr> <td></td> <td></td> <td>3</td> </tr> </table> <p><b>or</b> <math>\frac{60 \times 72}{12}</math> <b>or</b> 2, 2, 2, 3, 3, 5 oe</p>	2	60	72	2	30	36	3	15	18	2	5	6			3		2	<p>M1 for any correct valid method and no errors e.g.</p> <p>for starting to list at least <b>four</b> multiples of each number</p> <p><b>or</b> 2 2 3 5 <b>and</b> 2 2 2 3 3 seen (may be in a factor tree or a ladder diagram and ignore 1)</p> <p><b>or</b> a fully correct Venn diagram</p> <p><b>or</b> other clear method, e.g, table</p>
2	60	72																	
2	30	36																	
3	15	18																	
2	5	6																	
		3																	
		360		A1 dep M1 accept $2^3 \times 3^2 \times 5$ oe															
				<b>Total 4 marks</b>															

<b>19</b>	$7x + 3x + 8x = 360$ oe		4	M1	M2 for $7x = 140$
	$(x =) 360 \div 18 (= 20)$			M1	(140 can be on diagram)
	$360 \div (180 - 7 \times "20")$ oe or $360 \div (180 - "140")$ $\frac{(n-2) \times 180}{n} = 7 \times "20"$ oe or $360 \div 40$				M1 for $360 \div$ exterior angle
		9		A1	
					<b>Total 4 marks</b>

<b>20</b>	(a) $n^2 - 6n + 4n - 24$		2	M1 for any 3 correct terms <b>or</b> for 4 out of 4 correct terms ignoring signs <b>or</b> for $n^2 - 2n \dots$ <b>or</b> for $\dots - 2n - 24$
		$n^2 - 2n - 24$		A1 oe
	(b) $8x - 12$ <b>or</b> $\frac{3}{4}x - \frac{5}{4}$ oe or $0.75x - 1.25$ oe		3	M1 for correct multiplication by 4 <b>or</b> separate fractions on the RHS
	$8x - 3x = -5 + 12$ oe or $5x = 7$ oe <b>or</b> $2x - \frac{3}{4}x = -\frac{5}{4} + 3$ or $2x - 0.75x = -1.25 + 3$ oe			M1 ft (dep on 4 terms) for terms in $x$ on one side of equation and number terms on the other
		$\frac{7}{5}$		A1 oe dep on M1 1.4 or $1\frac{2}{5}$ oe
				<b>Total 5 marks</b>



<b>21</b>	(a)	$1 + 0.04 (= 1.04)$ <b>or</b> $100(\%) + 4(\%) (= 104(\%))$ <b>or</b> $\frac{634\,400}{104} (= 6100)$ oe		3	M1
		$634\,400 \div "1.04"$ <b>or</b> $634\,400 \div "104" \times 100$ <b>or</b> $634\,400 \times 100 \div "104"$ oe			M1
			No and 610 000		A1 dep on M2 for no and 610 000 seen oe E.g. Still (band) B and 610 000 oe
	(b)	$"0.85" \times "0.85" (= 0.7225)$ oe <b>or</b> $"0.85" - ("0.85" \times 0.15) (= 0.7225)$ <b>or</b> $\frac{"85" \times "85"}{100} (= 72.25)$ oe or [0.85 and 85 must come from correct working]		3	M1 allow use of their amount e.g. $200 \times "0.85" \times$ $"0.85" (= 144.5)$
		$1 - "0.7225" \mathbf{or} 0.2775 \mathbf{or} 100 - "72.25"$			M1 e.g. $\frac{200 - "144.5"}{200}$ ( $\times 100$ )
			27.75		A1 oe allow 27.8 or 28
					<b>Total 6 marks</b>

<b>22</b>	$1.4 = \frac{72}{(\text{area})}$ oe		4	M1
	$(\text{area}) = \frac{72}{1.4} (= \frac{360}{7} = 51.4\dots)$ oe			M1 (51.4 or better)
	“51.4...” × 18 <b>or</b> $r = \sqrt{\frac{“51.4\dots”}{\pi}} (= 4.046\dots)$ <b>and</b> $\pi \times “4.046”^2 \times 18$			M1 allow use of $\pi r^2$ to find the radius and then using $\pi r^2 h$ to find the volume
		926		A1 Allow 925 – 928
				<b>Total 4 marks</b>

<b>23</b>	(a)		$8.9 \times 10^{-5}$	1	B1
	(b)		83 400	1	B1
					<b>Total 2 marks</b>

<b>24</b>	(a)		8	1	B1
	(b)		11	1	B1 accept $x^{11}$
	(c)		$8k^6m^{12}$	2	B2 for all correct B1 for two correct from 8 or $k^6$ or $m^{12}$
					<b>Total 4 marks</b>

25	(a)	$(18-3)^2 + (7-(-1))^2$ oe or $15^2 + 8^2 (= 289)$ oe		3	M1
		$\sqrt{(18-3)^2 + (7-(-1))^2} (= \sqrt{289})$			M1
			17		A1
	(b)	$13 + 6 > "17"$	correct reason	1	<p>A1ft dep M1</p> <p><b>Acceptable examples</b></p> <p>"They overlap by 2cm"</p> <p>"The distance between the centres is less than the sum of the radii"</p> <p>"17 is less than the distance than the total of the radii"</p> <p>"19 is bigger than the distance between the centres"</p> <p><b>Not acceptable examples</b></p> <p>"19 is greater than the distance between the circles" oe</p> <p>"The circumference of each circle overlaps"</p>
					<b>Total 4 marks</b>

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