



# Mark Scheme (Results)

Summer 2022

Pearson Edexcel International GCSE  
In Mathematics A (4MA1)  
Paper 2F

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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
- eeo – 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.

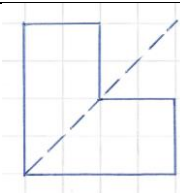
### **Ignoring subsequent work**

- 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.  
to another.

International GCSE Maths				
Apart from questions 20 and 26 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)		30	1	B1
(b)		0.29	1	B1
(c)		0.85	1	B1
(d)		-9, -7, -3, 8, 16	1	B1
(e)		0.009, 0.04, 0.044, 0.104, 0.2	1	B1 extra zeros at the end are fine and the numbers may be separated by any signs eg < or , etc
(f)	$1 - \frac{3}{10} (= \frac{7}{10})$ oe or $\frac{3}{10} \times 400 (= 120)$ oe		2	M1 or use of $\frac{7}{10}$ eg $\frac{400}{10} \times 7$
		280		A1 Cao
				<b>Total 7 marks</b>

2 (a)		<b>C, E</b>	1	B1 accept <b>E</b> and <b>C</b> as order does not matter
(b)		<b>A, F</b>	1	B1 accept <b>F</b> and <b>A</b> as order does not matter
(c)		Correct line	1	B1 correct line with no other lines
(d)		12	1	B1
(e)		8	1	B1
				<b>Total 5 marks</b>

<b>3</b>	(a)(i)		37	1	B1
	(ii)		+6	1	B1 oe eg 'added 6' or 'plus 6' or $6n + 1$ allow $31 + 6 = 37$ increase by 6 / goes up by 6
	(b)		169	1	B1
	(c)		All the numbers in the sequence are odd numbers	1	B1 96 is not odd / 96 is even 96 is a multiple of 6 (and terms are not multiples of 6) or No numbers in the sequence end in 6 / all end in 1, 3, 5, 7, 9 or the sequence is $6n + 1$ or it goes ...91, 97, ... oe or it should be 97 They need to add 1
					<b>Total 4 marks</b>

<b>4</b>	(a)		B	1	B1 Accept b or 'Country B' allow incorrect spelling if meaning is clear
	(b)		bar at height of 7	1	B1 any width is acceptable
	(c)		11	1	B1 Allow 11 million or 11 000 000 in the answer space
					<b>Total 3 marks</b>

5 (a)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">7</td> </tr> <tr> <td style="text-align: center;">6</td> <td style="text-align: center;">7</td> <td style="text-align: center;">8</td> <td style="text-align: center;">9</td> </tr> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">9</td> <td style="text-align: center;">10</td> <td style="text-align: center;">11</td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">11</td> <td style="text-align: center;">12</td> <td style="text-align: center;">13</td> </tr> </table>		1	2	3	2	3	4	5	4	5	6	7	6	7	8	9	8	9	10	11	10	11	12	13		2	B2 For all 10 entries correct in table (B1 for 6, 7, 8 or 9 correct entries)
	1	2	3																									
2	3	4	5																									
4	5	6	7																									
6	7	8	9																									
8	9	10	11																									
10	11	12	13																									
(b)(i)		$\frac{10}{15}$	1	B1ft oe eg $\frac{2}{3}$ or 0.66, 0.67, 0.666, 0.667 etc																								
(ii)		$\frac{8}{15}$	1	B1ft 0.53(333...) (SC B1(marks in (ii)) if both parts using “correct values” but incorrect probability notation eg 10 : 15, 8 : 15)																								
<b>Total 4 marks</b>																												

<b>6</b>	$12 \times 1.40 + 12 \times 0.5 \times 1.40 (=25.20)$ oe eg $(1.4 + 0.7) \times 12 (= 25.20)$		4	M1 correct method to find the cost for offer A
	$0.8 \times 7.20 \times "4" (=23.04)$ oe or $"4" \times 7.20 - 0.2("4" \times 7.20)$ oe eg $28.80 - 5.76 (= 23.04)$ where $4 = 24 \div 6$			M1 indep correct method to find the cost for offer B
	$12 \times 1.40 + 12 \times 0.5 \times 1.40 - 0.8 \times 7.20 \times 4$ or “25.20” – “23.04”			M1 dep on M2 A fully correct method to find the difference
		2.16		A1 allow -2.16
<b>Total 4 marks</b>				

7	$2 \times \pi \times 6.5$ or $\pi \times 13$ oe		2	M1 Allow use of $\pi$ as 3.14(2...) or $\frac{22}{7}$
		40.8		A1 40.8 – 40.9
				<b>Total 2 marks</b>

8	$200 - 37 - 25 - 42 (= 96)$ oe eg 200 – “104” (= 96) or $\frac{37 + 25 + 42}{200} \left( = \frac{104}{200} \right)$		3	M1
	$\frac{96}{200}$ or $\frac{13}{25}$			M1ft for a correct fraction, but not in lowest terms or for 0.48 or 48% or for cancelling their $\frac{104}{200}$ to simplest form (if their fraction cannot be cancelled then this mark is not awarded)
		$\frac{12}{25}$		A1 cao
				<b>Total 3 marks</b>



<b>9</b>	200 (ml) written as 0.2 (l) or 3.5 (l) written as 3500 (ml)		4	B1 for a correct conversion
	$3 \times "0.2" (= 0.6)$ oe eg $0.2 + 0.2 + 0.2$ or $3 \times 200 (= 600)$ oe eg $-200-200-200$ or $3500 - 600 (= 2900)$			M1 A correct calculation for the total amount of water in the 3 cups or the 4 jugs
	$\frac{3.5 - "0.6"}{4}$ or $\frac{"3500" - "600"}{4}$ oe			M1 For a fully correct method or for an answer of 0.725 (this alone gains B1M2)
		725		A1 (SCB1M1 (no other marks) for $(3.5 - 0.2) \div 4 (= 0.825)$ or $(3500 - 200) \div 4 (= 825)$ )
				<b>Total 4 marks</b>

<b>10</b>	(Area of kite = )12		3	B1 for a correct area of the kite – may be implied by their diagram
				M1 for any rectangle
				A1ft A correct rectangle or ft for a rectangle with their stated area of the kite
				<b>Total 3 marks</b>

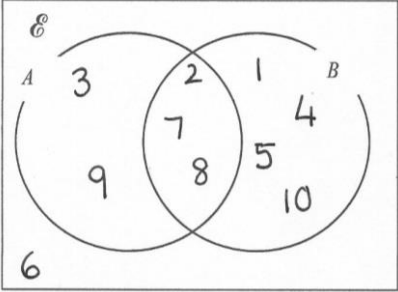
<b>11</b>	(a)	$c^6$	1	B1
	(b)	$6h^3$	1	B1
	(c)	$x^2 + 5x$	1	B1
	(d)	$3(3y - 4)$	1	B1
	(e)	$T = 15m + 40p$	3	B3 ((B2 for $15m + 40p$ or $T = 15m + xp$ or $T = ym + 40p$ or $T = 40m + 15p$ ) (B1 for $15m + xp$ or $ym + 40p$ or $40m + 15p$ or for $T =$ an incorrect expression in $m$ and $p$ eg $T = mp$ )) Allow $15 \times m$ or $m15$ etc
				<b>Total 7 marks</b>

<b>12</b>	$1342 \div 11 (=122)$ or $125 \times 11 (=1375)$		3	M1
	$125 - \text{"122"} (=3)$ or $\text{"1375"} - 1342 (=33)$			M1
		3 euros or 33 (Swedish) Krona		A1 Answer <b>must</b> have correct units which may be shortened eg € or SK or krona
				<b>Total 3 marks</b>

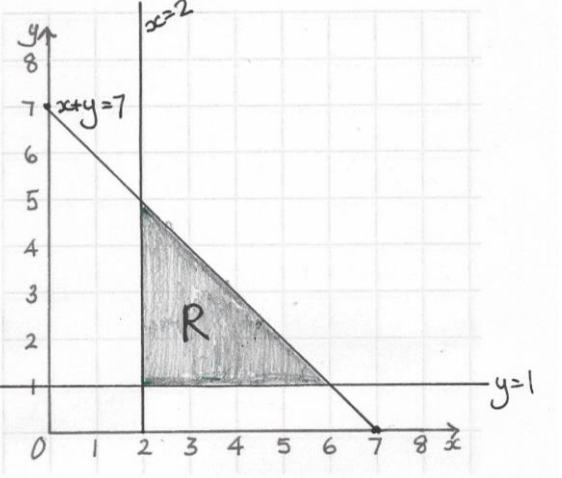
<b>13</b>		<i>BO, BA, BW, FO, FA, FW, CO, CA, CW</i>	2	B2 B2 all correct combinations with no repeats or errors (B1 for at least 4 correct combinations ignoring repeats)
				<b>Total 2 marks</b>

<b>14</b>	(a)	Rotation, rotate, rotated (not turn)	rotation  180° about (0, 0) or <i>O</i>	2	B1 oe with no mention of reflection, translation, enlargement, move, flip etc  B1 oe with no mention of a line, column vector or SF  (SCB1 for ‘half turn about (0, 0) or <i>O</i> ’ with no contradictory statements) <hr/> <b>Alternative:</b> B2 for enlargement with centre <i>O</i> and SF -1 (B1 for enlargement with no mention of other transformation, B1 for centre <i>O</i> and SF -1)
	(b)	(-4, 1)(-6, 1)(-6, 3)(-5, 3)(-5, 4)(-4, 4)	A correct shape	2	B2 (B1 for a ‘correct’ shape reflected in any vertical line or a correct reflection in the line $y = -1$ or reflection of shape <b>B</b> in the line $x = -1$ )
<b>Total 4 marks</b>					

<b>15</b>	$\frac{579}{490}$ or 1.18163.....		2	M1 or 70.1, 70.07, 70.071, 70.072, 70.0716
		70.07163(265.....)		A1 at least 5 dp truncated or rounded
<b>Total 2 marks</b>				

16			3	<b>B3</b> For all 4 regions of Venn diagram correct (B2 for 2 or 3 regions correct, B1 for 1 region correct) numbers must not be repeated in a region
				<b>Total 3 marks</b>

17			3	<b>M1</b> for $d = 9$ <b>or</b> $(c + d) \div 2 = 8$ (algebraically or clearly labelled integers) <b>or</b> $d - a = 4$ (algebraically or clearly labelled integers)
				<b>M1</b> for two of $a = 5$ <b>or</b> $c = 7$ <b>or</b> $d = 9$ <b>or</b> $(c + d) \div 2 = 8$ (algebraically or clearly labelled integers) <b>or</b> $d - a = 4$ (algebraically or clearly labelled integers)
		$a = 5, b = 6,$ $c = 7, d = 9$		<b>A1</b> All correct
				<b>Total 3 marks</b>

<p><b>18</b> (a)(i)</p> <p>(ii)</p> <p>(iii)</p>	 <p>Line length 2cm + but shaded area must be enclosed for the mark in (b)</p>		<p>3</p>	<p>B1 <math>y = 1</math> drawn</p> <p>B1 <math>x = 2</math> drawn</p> <p>B1 <math>x + y = 7</math> drawn</p> <p>Allow dashed lines or solid lines for graphs  <b>condone lack of labels if unambiguous</b></p>
<p>(b)</p>			<p>1</p>	<p>B1 correct region shaded – shaded in or out – labelled <b>R</b> or clear intention to be the required region  (ft only for one vertical line, one horizontal line and one line with a negative gradient)</p>
<p><b>Total 4 marks</b></p>				

<b>19</b>	For sight of 5 hrs 24 mins = 5.4 (hrs) or $5\frac{24}{60}$ ( $=5\frac{2}{5}$ ) oe or 324 (mins)		3	B1
	$3980 \div 5.4$ oe or $\frac{3980}{324} \times 60$			M1 For distance $\div$ time that should give a speed in km/h. (SC allow $3980 \div 5.24$ (= 759.5... or 760) for this mark unless mark has been awarded for 324 minutes or 5.4 hours oe )
		737		A1 awrt 737 (if no working shown, 738 gets SCB2)
				<b>Total 3 marks</b>

20	$\frac{16}{3} - \frac{20}{7}$ or $(5)\frac{7}{21} - (2)\frac{18}{21}$ or $(5)\frac{7a}{21a} - (2)\frac{18a}{21a}$		3	M1 for correct improper fractions or fractional part of numbers written correctly over a common denominator
	$\frac{112}{21} - \frac{60}{21}$ or $\frac{112a}{21a} - \frac{60a}{21a}$ or $5\frac{7}{21} - 2\frac{18}{21} = 3 - \frac{11}{21}$ oe or $5\frac{7}{21} - 2\frac{18}{21} = 4\frac{28}{21} - 2\frac{18}{21}$			M1 for correct fractions with a common denominator with minus sign or mixed numbers to the stage shown
	$\frac{112}{21} - \frac{60}{21} = \frac{52}{21} = 2\frac{10}{21}$ oe or $3 - \frac{11}{21} = 2\frac{10}{21}$ or $5\frac{7}{21} - 2\frac{18}{21} = 4\frac{28}{21} - 2\frac{18}{21} = 2\frac{10}{21}$	Shown		A1 Dep on M2 for a correct answer from fully correct working  If all 3 fractions turned into improper fractions on the first line $\frac{16}{3} - \frac{20}{7} = \frac{52}{21}$ then the student <b>clearly</b> needs to show that the LHS $= \frac{52}{21}$
				<b>Total 3 marks</b>

21	<p> <math>28 \times 12 (=336)</math> or <math>5 \times 12 (= 60)</math> or <math>18 \times 12 (= 216)</math>  or  <math>28 \times 20 (=560)</math> or <math>\frac{1}{2}(CD + "18")"8"</math> oe eg <math>72 + 4CD</math>  [numbers in “ ” come from correct working]  <b>Check diagram for areas</b> </p>		4	<p>M1 For a correct method to find the area of a rectangle (may be seen as part calculation) or a correct expression for the area of the trapezium with numbers substituted.</p> <p>Allow for other correct method to find area linked to this shape.</p>
	<p> “336” + <math>0.5("18" + CD)"8" = 434</math> oe eg  <math>4("18" + CD) = 98</math>  or  eg <math>0.5("18" + CD)"8" = "98"</math> oe eg <math>\frac{1}{2}(18 + CD) = 12.25</math>  or  <math>"560" - 2(0.5(5 + x)"8") = 434</math> oe (where <math>x</math> is horizontal from <math>D</math> to perp with <math>AF</math>)  [numbers in “ ” come from correct working] </p>			<p>M1 correct use of their values from correct working for an equation involving <math>CD</math> (<math>CD</math> could be labelled with any letter)</p>
	<p> eg <math>(CD =) \frac{196 - 144}{8} \left( = \frac{52}{8} \right)</math> or <math>(CD =) \frac{98 - 72}{4} \left( = \frac{26}{4} \right)</math>  or <math>(CD =) \frac{434 + 152 - 560}{4}</math> or <math>(CD =) 2 \times 12.25 - 18</math> or  <math>98 \times 2 (= 196)</math>, <math>"196" \div 8 (= 24.5)</math>, <math>"24.5" - 18</math> </p>			<p>M1 a correct process to solve a correct equation <b>or</b> a correct process to find <math>CD</math> using <b>correct values</b></p>
		6.5		A1 oe
				<b>Total 4 marks</b>



22	$\cos 42 = \frac{x}{9.5} \text{ or}$ $\tan 42 = \frac{9.5 \sin 42}{x} \text{ or}$ $\sin(90 - 42) = \frac{x}{9.5} \text{ or}$ $\frac{x}{\sin 48} = \frac{9.5}{\sin 90} \text{ or}$ $9.5^2 - (9.5 \sin 42)^2$		3	M1 a correct trig statement for $x$ or correct Pythagoras for $x^2$
	$(x =) 9.5 \cos 42 \text{ or}$ $(x =) \frac{9.5 \sin 42}{\tan 42} \text{ or}$ $(x =) 9.5 \sin(90 - 42) \text{ or}$ $(x =) \frac{9.5 \sin 48}{\sin 90} \text{ or}$ $(x =) \sqrt{9.5^2 - (9.5 \sin 42)^2}$			M1 a fully correct calculation to find $x$
		7.1		A1 awrt 7.1
				<b>Total 3 marks</b>

<b>23</b>	$\times 1000$ $(\div 60 \div 60)$ or $\div 3600$ or sight of 81 000 or 1350 or 0.0225		3	M1 For one of $\times 1000$ (eg sight of 81 000) or $(\div 60 \div 60)$ or $\div 3600$ oe
	$\frac{81 \times 1000}{60 \times 60}$ oe eg $\frac{81}{3.6}$ or $81 \times \frac{5}{18}$ oe			M1 For a fully correct method with correct use of brackets eg $81000 \div 60 \times 60$ is M1 only if not recovered
		22.5		A1 oe eg $\frac{45}{2}$
				<b>Total 3 marks</b>

24	$300 \div (7 + 5 + 3) (= 20)$ <b>clear correct use</b> of $7 + 5 + 3 (= 15)$ eg division at the end by 15 $\left(\frac{"2.8"+"1.8"}{15}\right)$ or correct use of 15 in a fraction eg $\frac{2}{5} \times \frac{7}{15}$		5	M1 (no mark for "15" unless it is used correctly)  use of $7 \times 20$ or 140 or $5 \times 20$ or 100 in further work assumes this mark
	$\frac{2}{5} \times (7 \times "20") (=56)$ oe eg $0.4 \times 140 (= 56)$ or $\frac{2}{5} \times 7 \left( = \frac{14}{5} = 2.8 \right)$ or eg $\frac{2}{5} \times \frac{7}{15} \left( = \frac{14}{75} = 0.186\dots \right)$			M1 finding $\frac{2}{5}$ of the number of birthday cards  or $\frac{2}{5}$ of the share of 7 or $\frac{2}{5}$ of fraction of amount
	$0.36 \times (5 \times "20") (=36)$ or $0.36 \times 5 (= 1.8)$ or eg $\frac{36}{100} \times \frac{5}{15} \left( = \frac{180}{1500} = 0.12 \right)$ oe			M1 finding 36% of anniversary cards Or 36% of the share of 5 or 36% of fraction of amount
	$\frac{"56"+"36"}{300}$ or  eg $\left(\frac{"2.8"+"1.8"}{15}\right)$ or $\frac{\frac{14}{5} + \frac{9}{5}}{15}$  " $\frac{14}{75}$ " + " $\frac{180}{1500}$ "			M1 for any fraction from correct working that isn't simplified or 30.66..% or 0.3066...
		$\frac{23}{75}$		A1 cao
				<b>Total 5 marks</b>

25	$50\,000 \times 1.013 (=50\,650)$ oe Or $50\,000 \times 0.013 (= 650)$ oe  (NB: accept $\left(1 + \frac{1.3}{100}\right)$ for 1.013 but not $(1 + 1.3\%)$ )		3	M1 For finding 101.3% or 1.3% of 50 000	M2 for $50000 \times 1.013^4$ <b>or</b> $50000 \times 1.013^5$
	“50 650” $\times 1.013 (=51\,308.45)$ “51 308.45” $\times 1.013 (=51\,975.45\dots)$ “51 975.45...” $\times 1.013$			M1 dep for a complete method	
		52 651		A1 awrt 52 651 if no marks awarded then SCB1 for $50\,000 \times 0.013^n$ $50\,000 \times 0.987^4 (= 47450\dots)$ $50\,000 \times 0.052 (= 2600)$ $50\,000 \times 1.052 (= 52600)$ $50000 \times 1.013^2 (= 51308.45)$ $50000 \times 1.013^3 (= 51975.45\dots)$	
				<b>Total 3 marks</b>	

<b>26</b>	eg $\begin{matrix} +7x+3y=3 \\ 9x-3y=21 \end{matrix}$ or $\begin{matrix} -21x+9y=9 \\ 21x-7y=49 \end{matrix}$		3	M1 a correct method to eliminate $x$ or $y$ – multiplying one or both equations so that one variable can be eliminated (allow a total of one error in multiplication) <b>and</b> the correct operation to eliminate or for substitution of one variable into the other equation.
	or eg $7x+3(3x-7)=3$ or $7\left(\frac{7+y}{3}\right)+3y=3$			M1 dep on M1 for a correct method to calculate the value of other letter eg substitution or starting again with elimination
	If first M1 gained then they can substitute an incorrect value if from ‘correct’ method to gain this mark.			A1 oe dep on M1
		$x = 1.5, y = -2.5$		

<b>27</b>	(i)	$(x \pm 3)(x \pm 8)$	2	M1 or $(x + a)(x + b)$ where $ab = -24$ or $a + b = 5$
		$(x - 3)(x + 8)$		A1
	(ii)	3, -8	1	B1ft Must ft from their answer to (i) ft from their incorrect factors in the form $(x + a)(x + b)$
				<b>Total 3 marks</b>

<b>28</b>	$7 \times 2.7 (=18.9)$ or $4 \times 3.3 (= 13.2)$ or $\frac{3W + 4 \times 3.3}{7} = 2.7$ oe eg $3W + 13.2 = 18.9$		3	M1 For one correct product or for a correct equation for $W$
	$\frac{7 \times 2.7 - 4 \times 3.3}{3}$ or $\frac{18.9 - 13.2}{3}$ or $\frac{5.7}{3}$ or $3W = 5.7$			M1
	If you see 1.9 from correct working and they do further work to this value, award M2	1.9		A1
				<b>Total 3 marks</b>

