Mark Scheme

January 2022

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

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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					
Q		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		El Salvador	1	B1
	(b)		400	1	B1 Allow hundred oe
	(c)		Bahamas & Syria	1	B1
	(d)		Three thousand, three hundred and seventy one	1	B1
					Total 4 marks

2	(a)(i)		(3, 4)	1	B1
	(ii)		(−1, 2)	1	B1
	(b)		Cross at (7, 2)	1	B1
	(c)		(1, 3)	2	B2 for (1, 3) (B1 for one coordinate correct)
					Total 5 marks

3	(a)		cylinder	1	B1 allow circular prism
	(b)		12	1	B1
					Total 2 marks

4	(a)		34	1	B1
	(b)		18	1	B1
					Total 2 marks

5	(a)		64	1	B1
	(b)		0.45	1	B1
	(c)		$\frac{3}{8}$	1	B1
	(d)		$2\frac{3}{4}$	1	B1
	(e)		square	1	B1
					Total 5 marks

6	24 ÷ 4 (= 6) **or** width = 24		3	M1 Could be clearly shown on diagram.
	10 × '6' oe **or** 24 + 24 + 6 + 6 oe			M1 dep M1
		60		A1 SC if no other marks scored B1 for 24 × 4 (= 96)
				Total 3 marks

7	(a)	21 : 48		2	M1 or 16 : 7
			7 : 16		A1 cao
	(b)		$\frac{11}{15}$	1	B1 oe exact fraction
					Total 3 marks

8	0.14 × 350 (= 49)		3	M1
	'49' + 25 or 0.14 × 350 + 25			M1
		74		A1
				Total 3 marks

9	(i)	360 – (92 + 44) (= 224) oe **or** 92 + 44 + x + x = 360 oe		3	M1
		'224' ÷ 2 or 2x = '224' oe			M1
			112		A1
	(ii)		Correct reason	1	B1 dep on M1 for a correct reason Angles in a quadrilateral sum to 360^o (accept Angles in a quadrilateral sum to 360^o)
					Total 4 marks

10	12 × 11.75 (= 141)		3	M1
	(181 – '141') ÷ 5			M1
		8(.00)		A1
				Total 3 marks

11		TV, TB, TT, NV, NB, NT, HV, HB, HT	2	B2 for all combinations with no repeats or incorrect combinations If not B2 then award B1 for at least 4 correct combinations (ignore repeats or incorrect combinations)
				Total 2 marks

12	$175+175+175+330\,(=855)$ or $\frac{330}{'855'}$		3	M1
	$\frac{330}{175+175+175+330}\times 100$ or $\frac{330}{'855'}\times 100$			M1
		38.6		A1 Answers in range 38.59 to 38.6
				Total 3 marks

13	65 × 35 × 45 (= 102 375) and 5 × 5 × 5 (= 125) or (65 ÷ 5) (= 13), (35 ÷ 5) (= 7) and (45 ÷ 5) (= 9)		3	M1
	'102 375' ÷ '125' or '13' × '7' × '9'			M1
		819		A1
				Total 3 marks

14	eg 360 – (160 + 90) (= 110)	eg $360\times\frac{400}{160}(=900)$ oe or $90\times\frac{400}{160}(=225)$ oe		3	M1 method to calculate angle for Sandeep **or** total number of votes **or** for number of votes for Anjali
	eg $\frac{400}{160}\times'110'$ oe	'900'–'225'–400			M1 complete method to calculate number of votes for Sandeep
			275		A1
					Total 3 marks

15	(a)		3	1	B1
	(b)		$8x - x^2$	1	B1 or $-x^2 + 8x$
	(c)	$5 \times 4.2 - 6 \times -2.5$ **or** $21 - -15$ **or** $21 + 15$ oe		2	M1
			36		A1
	(d)	$k - t = 2g$ or $\frac{k}{2} = g + \frac{t}{2}$ or $\frac{k-t}{2}$		2	M1 for isolating terms in g **or** for correctly dividing by 2.
			$g = \frac{k-t}{2}$		A1 oe e.g. $g = \frac{k}{2} - \frac{t}{2}$
					Total 6 marks

16	(a)	eg $\frac{3}{8}\times\frac{32}{27}$ **or** $\frac{12}{32}\div\frac{27}{32}$		2	M1 Inverting $\frac{27}{32}$ and changing to multiply **or** writing both factions with the same denominator.
		eg $\frac{3}{8}\times\frac{32}{27}=\frac{96}{216}=\frac{4}{9}$ **or** $\frac{12}{32}\div\frac{27}{32}=\frac{12}{27}=\frac{4}{9}$ **or** eg $\frac{\cancel{3}^{1}}{\cancel{8}^{1}}\times\frac{\cancel{32}^{4}}{\cancel{27}^{9}}=\frac{4}{9}$	Shown		A1 Conclusion to $\frac{4}{9}$ - either sight of the result of the multiplication eg $\frac{96}{216}$ or $\frac{48}{108}$ or $\frac{24}{54}$ must be seen **or** fully correct cancelling must be seen prior to multiplication NB use of decimals scores no marks.
	(b)	eg $\frac{40}{48}-\frac{18}{48}$ or $\frac{20}{24}-\frac{9}{24}$		2	M1 for correct fractions with a common denominator of 24 or a multiple of 24
		eg $\frac{40}{48}-\frac{18}{48}=\frac{22}{48}=\frac{11}{24}$ or $\frac{20}{24}-\frac{9}{24}=\frac{11}{24}$	Shown		A1 dep M1 for a correct answer from fully correct working.
					Total 4 marks

17	(a)		140	1	B1 accept 138 – 142 May be seen on diagram.
	(b)	[5.8, 6.2]		4	M1
		'[5.8, 6.2]' × 500 (= '[2900, 3100]')			M1 ft
		'[2900, 3100]' ÷ 0.44			M1 ft
			6818		A1 ft answer in range 6590-7045 but must be an integer
					Total 5 marks

18	(a)	1 – (0.24 + 0.16 + 0.38) oe		2	M1
			0.22		A1 oe
	(b)	0.24 + 0.16 (= 0.4) oe		2	M1
			0.4		A1 oe
					Total 4 marks

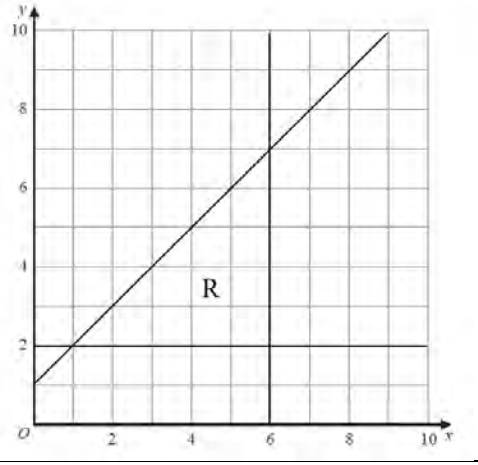
19 (a)	720 ÷ 12 (= 60) or 78 × 12 (= 936)			4	M1	
	78 – '60' (= 18) or '936' – 720 (= 216)	$'x' \times 720 = 936$ or $720(1+\frac{P}{100}) = '936'$ or $('x' =) \frac{'936'}{720} (=1.3)$ oe			M1	
	$\frac{'18'}{60} \times 100$ or $\frac{'216'}{720} \times 100$	$'1.3' \times 100 - 100$ oe or $(1.3-1) \times 100$			M1 complete method to find *P*	
			30		A1 ignore extra % sign if given by candidate.	
(b)	0.18 × 1600 (= 288) oe or 0.82 × 1600 + 800 (= 2112)			3	M1 if 1600 × 18% seen, must have further processing of the 18% or the value (288) given.	M2 for 1.5 × 12.5 (= 18.75) or 18 ÷ 1.5 (= 12)
	0.125 × (1600 + 800) (= 300) oe or (1600 + 800) × 0.875 (= 2100)				M1	
			Coupon B and correct figures seen		A1 for Coupon B **and** 288 and 300 or 18.75(%) and 18(%) or 12(%) and 12.5(%) or 2112 and 2100	
						Total 7 marks

20	(a)	$4y > 12 - 5$		2	M1 Allow $y = \frac{7}{4}$ oe or $y < \frac{7}{4}$
			$y > \frac{7}{4}$		A1 oe
	(b)	$12x - 10$ **or** $2(6x - 5) = 4x - 7$ **or** $6x - 5 = \frac{4}{2}x - \frac{7}{2}$ oe		3	M1 for removal of fraction **and** multiplying out LHS **or** rearranging to remove the fraction **or** separating fraction (RHS) in an equation
		$12x - 4x = -7 + 10$ oe **or** $6x - \frac{4}{2}x = -\frac{7}{2} + 5$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation and number terms on the other
			$\frac{3}{8}$		A1 (dep M1) oe
					Total 5 marks

21	360 ÷ 8 (= 45) or 360 ÷ 5 (= 72) or 180 – (360 ÷ 8) (= 135) oe or 180 – (360 ÷ 5) (= 108) oe		4	M1 finding interior or exterior angle of octagon or pentagon Angles may be seen on diagram – but must be obtuse if interior and acute if exterior.
	'72' – '45' (= 27) or '135' – '108' (= 27)			M1 (dep 1st M1) using a pair of interior or pair of exterior angles to find angle *IBC* Angle may be seen on diagram.
	$\frac{180-'27'}{2}$ (= 76.5)			M1
		76.5		A1
				Total 4 marks

22	7200 × 0.025 (= 180) or 7200 × 1.025 (= 7380) oe or 7200 × 1.075 (= 7740) oe or 7200 × 0.075 (= 540) oe		3	M1	M2 for 7200 × $(1.025)^3$
	(7200 + '180') × 0.025 (= 184.5) and (7200 + '180' + '184.5') × 0.025 (= 189.1125) and 7200 + '180' + '184.5' + '189.1…' (= 7753.6125)			M1 NB year end values are 7380 and 7564.5(0) 7753.6125	
		7754		A1 answer in range 7753 – 7754	
				Total 3 marks	

23	(a)		1	1	B1
	(b)		6	1	B1
	(c)	$206 + m - 214 = -3$ oe or $\frac{7^{-3} \times 7^{214}}{7^{206}}$ or $\frac{7^{211}}{7^{206}}$ oe		2	M1 allow $7^{206+m-214} = 7^{-3}$ oe (must be in the form $7^x = 7^y$ where x and y are correct expressions)
			5		A1 accept 7^5
					Total 4 marks

24	(a)		$y = -3x + 5$ oe	2	B2 fully correct equation eg $y = -3x + 5$ or $y - 5 = -3(x - 0)$ If not B2 then B1 for $y = -3x + a$ with $a \neq 5$ or $y = bx + 5$ ($b \neq 0, -3$) or ($L =$) $-3x + 5$
	(b)	Lines (solid or dashed) $x = 6$ **and** $y = 2$ drawn		3	B1 The lines $x = 6$ and $y = 2$ should extend far enough to intersect with each other.
		Line (solid or dashed) $y = x + 1$ drawn			B1 The line should extend from at least $x = 1$ to $x = 6$ **or** far enough to intersect with their horizontal and vertical lines.
		Region R shown (shaded or not shaded)  	Correct region identified		B1 dep on B2
					Total 5 marks

25	22 × 260 (= 5720) or 50 × 218 (= 10 900)		3	M1
	$\frac{'10900' - '5720'}{28} \quad \left(= \frac{5180}{28}\right)$			M1
		185		A1
				Total 3 marks

26	$\cos 30 = \frac{24}{(AC)}$ or $\sin'60' = \frac{24}{(AC)}$ **or** $\frac{\sin'60'}{24} = \frac{\sin 90}{(AC)}$ oe		5	M1 for correct trig ratio involving AC	M2 for use of tan **and** Pythagoras to obtain AC $(AB =)\ 24\tan 30\ (=13.856...)$ **and** $\sqrt{'13.856...'^2 + 24^2}\ (=27.712...)$ If not M2, then M1 for use of tan and Pythagoras to obtain AC^2 $(AB =)\ 24\tan 30\ (=13.856...)$ **and** $'13.856...'^2 + 24^2\ (=768)$
	$(AC =)\frac{24}{\cos 30}\ (=16\sqrt{3} = 27.712\ldots)$ or $(AC =)\frac{24}{\sin'60'}\ (=16\sqrt{3} = 27.712\ldots)$ **or** $(AC =)\frac{24\times\sin 90}{\sin'60'}$			M1 for a correct trig ratio for AC	
	$\frac{1}{2}\times 2\times\pi\times 3\ (=3\pi = 9.424\ldots)$			M1 for using $\pi\times 2\times 3$ or $2\pi\times 3$ correctly to find the arc length of the semicircle, or circumference of a circle with radius 3.	
	'27.712…' + '9.424…' – 2×3			M1 for a complete correct method to find the length $AFEDC$	
		31		A1 accept answers in range from 31 to 31.15	
					Total 5 marks

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