Pearson

Mark Scheme

Specimen Paper

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

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Specimen Paper
Publications Code 4MA1_2H_EAM_MS

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
    - 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.
  Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.
  If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
  If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.
  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 in another.

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International GCSE Mathematics A
4MA1/2H

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International GCSE Maths				
Apart from questions 10, 11, 14, 17 and 21 (where the mark scheme states otherwise) the correct answer, unless clearly obtained from an incorrect method, should be taken to imply a correct method.				
Q	**Working**	**Answer**	**Mark**	**Notes**
1 (a)		$12e^9f^2$	2	B2 B1 for 2 correct parts
(b)		$9a^8$	2	B2 B1 for 9or a^8
(c)	$5q \geq 31$ or $2q + 3q \geq 31$	$q \geq 6.2$	2	M1 For $5q \geq 31$ or $2q + 3q \geq 31$ or $5q = 31$ or $q = 6.2$ for $q \leq 6.2$ or an answer of 6.2 following $q \geq 6.2$ in working A1 oe, ($q > 6.2$ is M1 only)
(d)		−2, −1, 0, 1, 2	2	B2 B1 for 4 correct and none incorrect or all correct with one addition.
				Total 8 marks

2	$\pi \times 8.5^2$ (=226.98...) (area of trapezium =) $(20 + 25) \div 2 \times h$ oe (=22.5h) $\pi \times 8.5^2 \div 22.5$	10.1	4	M1 A correct method to find the area of the circle M1 Use of correct formula for trapezium M1 A correct method to find h A1
				Total 4 marks

3	(a)	1 – (0.26 + 0.3) (=0.44) "0.44" ÷ 2	0.22	3	M1 M1 A1	
	(b)	91 ÷ 0.26 (=350) or (0.3 ÷ 0.26) × 91 (=105)) (91 + 0.3 × "350") ÷ 4 [(91 + "105") ÷ 4] oe	49	3	M1 M1 A1	A correct method to find total number of bricks or number of blue bricks A correct method to find number of layers
						Total 6 marks

4	(a)		$4n + 3$	2	B2	B1 for $4n + x$ where x is any integer
	(b)		78, 76, 74	2	B2	B1 for one correct term
	(c)		Correct reason	1	B1	The first sequence is only odd numbers and the second is only even numbers
						Total 5 marks

5	Eg $\frac{4}{100}\times 18000$ oe or 720	OR 18000×1.04^3		3	M1	for eg $\frac{4}{100}\times 18000$ oe or 720	OR M2 for 18000×1.04^3 (M1 for 18000 × 1.04 or 18720 or 18000 × 1.04^2 or 19468.8 or18000×1.04^4 or 21057.45)
	$\frac{4}{100}\times$ (18000+'720') = 748.80 $\frac{4}{100}\times$ (18000+'720'+'748.80') = 778.75				M1	for completing method	
						Accept 1 + 0.04 as equivalent to 1.04 throughout	
						SC: If no other marks gained, award M1 for 18000 × 1.12 oe or 20160 OR or 2160	
			2248		A1	Answers in range 2247 – 2248	
							Total 3 marks

6	$\tan x = \frac{8}{12}$ or $\sin x = \frac{8}{\sqrt{208}}$ or $\cos x = \frac{12}{\sqrt{208}}$ $x = \tan^{-1}\left(\frac{8}{12}\right)$ or $\sin^{-1}\left(\frac{8}{\sqrt{208}}\right)$ or $\cos^{-1}\left(\frac{12}{\sqrt{208}}\right)$	33.7	3	M1 A correct trig ratio for angle x M1 A complete method to find angle x A1 Accept answers which round to 33.7
				Total 3 marks

7	(x =) 360 – (90 + 90 + 52)	128 Correct reasons	4	M1 A1 B1 The angle between a tangent and a radius is 90° oe B1 Angles in a quadrilateral add up to 360° oe
				Total 4 marks

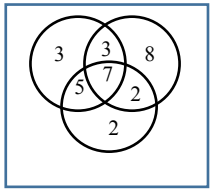
8	(31.50 ÷ 7) × 8 oe (=36) '36'× 1.2 oe	43.2(0)	3	M1 Correct method to find the amount Behnaz has M1 Correct method to find the amount Ahmed has A1
				Total 3 marks

9	(a)		4, 18, 35, 48, 55, 58, 60	1	M1	Correct cumulative frequencies
	(b)		Points correct	2	B1	$\pm$ ½ sq
			Curve or line segments		B1	ft from points if 4 or 5 correct or if points are plotted consistently within each interval at the correct heights Accept curve which is not joined to the origin
	(c)	15 and 45 or 15.25 and 45.75 indicated on cumulative frequency axis or stated	Approx 19	2	M1 A1	 If M1 scored ft from CF graph. If M1 not scored, ft from correct curve and, if answer is correct ($\pm$½sq) award M1A1
	(d)	A vertical line from 48 up to the cf graph	Approx 6	2	M1 A1	 If M1 scored ft from CF graph. If M1 not scored, ft from correct curve and, if answer is correct ($\pm$½sq) award M1A1
						Total 7 marks

10	360 ÷ 8 (=45) 360 ÷ 5 (=72)_ 72° − 45° (=27°) 180 – 2 × 27	 126	5	M1 M1 M1 M1 A1	Method to find exterior angle of octagon or pentagon Method to find exterior angle of both octagon and pentagon Method to find *CAB* or *CBA* Fully correct method to find angle *y* dep on at least M2
	Alternative				
	360 ÷ 8 (=45) 180 – 45 (=135) 360 ÷ 5 (=72)_180 – 72 (=108) 135° − 108° (=27°) 180 – 2 × 27	 126	5	M1 M1 M1 M1 A1	Method to find interior angle of octagon or pentagon Method to find interior angle of both octagon and pentagon Method to find *CAB* or *CBA* Fully correct method to find angle *y* dep on at least M2
					Total 5 marks

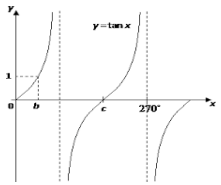
11	Eg $\frac{2(3x-2)}{10}-\frac{5(3-4x)}{10}=2$ or $\frac{2(3x-2)-5(3-4x)}{10}=2$ or $2(3x-2)-5(3-4x)=2\times 10$		4	M1	for clear intention to multiply all terms by 10 or a multiple of 10 or to express LHS as a single fraction with a denominator of 10 or a multiple of 10
	$6x-4-15+20x=2\times 10$ oe $\frac{6x-4-15+20x}{10}=2$			M1	Expanding brackets
	$26x=39$ or $6x+20x=20+4+15$ $6x+20x=39$ oe			M1	For correct rearrangement of a correct equation with terms in x isolated
		1.5		A1	Award full marks for a correct answer if at least M1 scored
					Total 4 marks

12	(a)		$3x^2 - 12x - 15$	2	B2	B1 for 2 correct terms
	(b)	$3x^2 - 12x - 15 = 0$ $(3x + 3)(x - 5)$ (=0) $x = -1$ or $x = 5$	 (−1, 8) (5, −100)	4	M1ft M1 A1 A1	 Correct factorisation or correct use of quadratic formula One correct pair Both correct pairs
						Total 6 marks

13		20	3	M1 M1 A1	For at least 3 correct entries into Venn diagram 30 – (3 + 3 + 5 + 7 + 2 + 2)
					Total 3 marks

14 (a)		show	2	M1 A1	For selecting $10x = 3.2424....$ and $1000x = 324.2424...$ oe $\frac{321}{990}$
(b)	e.g. $\frac{4(7+\sqrt{5})}{49-5}$	$\frac{7}{11}+\frac{1}{11}\sqrt{5}$	3	M1 M1 A1	For multiplying the numerator and denominator by $(7 + \sqrt{5})$ For a correct single fraction with brackets expanded in denominator dep on correct working seen
					Total 5 marks

15	0.3×0.9 (=0.27) 0.7 + '0.27'	0.97	3	M1 M1 A1	The correct product for fail, pass A fully correct method to find the probability that Sophie passes 1st or 2nd time oe
					Total 3 marks

16	(a)(i) (ii) (b)		(180, 0) (270, −1)  	4	B1 B1 M1 Correct shape curve A1 Correct intersections of 0°, 180° and 360° with *x* axis
					Total 4 marks

17	12.45, 12.55, 135 or 145 Largest volume of cube = 12.55^3 Greatest number of spheres = $12.55^3 \div 135$ (=14.641899...)	14	4	B1 For sight of 12.45, 12.55, 124.5, 125.5, 135 or 145 M1 12.55^3 M1 Units must be consistent A1 Dep on M1
				Total 4 marks

18	(a) (i)		(7, −4)	1	B1
	(ii)		(3, −12)	1	B1
	(iii)		(6, −4)	1	B1
	(b)		9	1	B1
					Total 4 marks

19	(a)(i)		$2\mathbf{q} - \mathbf{p}$	1	B1
	(a)(ii)	$\overrightarrow{MB} = \frac{1}{4}\mathbf{p}$ or $\overrightarrow{BM} = -\frac{1}{4}\mathbf{p}$ $\overrightarrow{BN} = \frac{1}{2}(\mathbf{p}-\mathbf{q})$ or $\overrightarrow{NB} = \frac{1}{2}(\mathbf{p}-\mathbf{q})$	 $\frac{1}{2}\mathbf{q} - \frac{1}{4}\mathbf{p}$	2	M1 For correctly giving $\overrightarrow{MB}$ or $\overrightarrow{BM}$ or $\overrightarrow{BN}$ or $\overrightarrow{NB}$ A1
	(b)		MN is parallel to BD $BD = 4 \times MN$	2	A1 With suitable reasons A1 With suitable reasons
					Total 5 marks

20	$\frac{1}{3}\pi(2h)^2 h$ (=562.5π) or $\frac{1}{3}\times\pi\times r^2\times\frac{1}{2}r$ (=562.5π)		5	M1	A correct expression for the volume of the cone NB: other letters may be used rather than *r* and *h*
	$\frac{1}{3}\pi\times 4h^2\times h = 562.5\pi$ or $\frac{1}{3}\times\pi\times r^2\times\frac{1}{2}r = 562.5\pi$			M1	A correct equation for the volume of the cone with $(2h)^2$ expanded
	$h = \sqrt[3]{\frac{3\times 562.5}{4}} (=7.5)$ or $r = \sqrt[3]{3375}$			M1	A correct equation for *h* or *r*
	$\sqrt{'15'^2 + '7.5'^2} = \frac{15\sqrt{5}}{2} (=16.7705...)$			M1	A correct expression for *l*
	CSA = $\pi\times 15\times 16.77..$	790		A1	(786.5 – 791.7)
					Total 5 marks

21	$(2x+3)\times\dfrac{7}{(2x+3)(2x+5)}$		4	M1	For inverting and factorising
	$\dfrac{5}{4x^2-25}-\dfrac{7}{2x+5}$			M1	Correct subtraction shown ($(4x^2-25)$ can be factorised)
	$\dfrac{5-7(2x-5)}{4x^2-25}$ or $\dfrac{5-14x+35}{4x^2-25}$			M1	Correct single fraction, unsimplified ($(4x^2-25)$ can be factorised)
		$\dfrac{40-14x}{4x^2-25}$		A1	oe e.g. $\dfrac{40-14x}{(2x+5)(2x-5)}$
					Total 4 marks

22	$a + 2d = 19$		5	M1	A formula for term 3
	$\frac{10}{2}(2a + 9d) = 290$ oe			M1	A formula for the sum of the first 10 terms
	Eg $10a + 45d = 290$ $10a + 20d = 190$ Or $5(2(19 - 2d) + 9d) = 290$, $a = 11$, $d = 4$			M1	A correct method to find a or d
	10^{th} term $= 11 + 9 \times 4$ or $290 - 4.5(2 \times 11 + 8 \times 4)$	47		M1 A1	A correct method to find the 10^{th} term.
					Total 5 marks

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