

1MA1 Practice papers Set 2: Paper 2H (Regular) mark scheme – Version 1.0

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Question	Working	Answer	Mark	Notes
1.		4.2	3	M1 $1500 \div (100 \times 100)$ (= 0.15) M1 $28 \times "0.15"$ A1
2.	(i)	24 50 75	4	M1 for listing at least three multiples for any two of 25, 12, 8 M1 for listing at least three multiples for all of 25, 12, 8 A1 for 24, 50, 75 cao OR M1 for prime factorisation for any two of 25, 12, 8, eg in a factor tree M1 for prime factorisation for all of 25, 12, 8 or $2 \times 2 \times 2 \times 3 \times 5 \times 5$ A1 cao (SC B2 for $24k, 50k, 75k$)
	(ii)	600		B1 for 600 (or ft $600k$)

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3.	$8.4^2 + 8.4^2$ $\sqrt{70.56 + 70.56} = \sqrt{141.12}$	11.9 cm	3	M1 $8.4^2 + 8.4^2$ (or equivalent) M1 $\sqrt{70.56 + 70.56}$ or $\sqrt{141.12}$ A1 11.85 – 11.9
4.	$\frac{3}{4} \times 120 = 90,$ $\frac{1}{4} \times 120 = 30$ $\frac{2}{3} \times 90 = 60,$ $\frac{20}{100} \times 30 = 6$ 60 : 6	10 : 1	5	M1 for $\frac{3}{4} \times 120$ (or equivalent) or 90 or $\frac{1}{4} \times 120$ (or equivalent) or 30 M2 (indep) for $(1 - \frac{1}{3}) \times '90'$ (or equivalent) (or 60) AND $\frac{100 - 80}{100 \times 30}$ (or equivalent) (or 6) (M1 (indep) for $(1 - \frac{1}{3}) \times '90'$ (or equivalent) or 60 OR $\frac{100 - 80}{100 \times 30}$ (or equivalent) or 6 OR both $\frac{1}{3} \times 90 (= 30)$ and $\frac{80}{100} \times 30 (= 24)$ M1 (dep on at least M2) for '60' : '6' or 1 to 10 or 6 to 60 (or equivalent) or reversed ratio 6:60 A1 10:1 cao

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5.	$\pi(6)^2 - \pi(5)^2$ $= 113(.09\dots) - 78.5(39\dots)$ $= 34.55751919$	34.6	3	M1 for $\pi(6)^2$ (or equivalent) or $\pi(5)^2$ (or equivalent) or 113... or 78.5... M1 for $\pi(6)^2 - \pi(5)^2$ (or equivalent) A1 for 34.5 - 34.6
6.	$a = \text{cost (p) of an apple}$ $p = \text{cost (p) of a pear}$ $3a + 4p = 184$ $5a + 2p = 176$ $7a = 2 \times 176 - 184 = 168$	24, 28	4	B1 $3a + 4p = 184$ and $5a + 2p = 176$ (or equivalent) M1 correct process to eliminate a or p M1(dep on M1) substitute found value of a or p to find other variable A1 cao
7.	$\tan x = 14 \div 7.5 = 1.8666\dots$ $\tan^{-1} 1.8666\dots$	62	3	M1 for $\tan x = 14 \div 7.5 (= 1.8666\dots)$ M1 for $\tan^{-1} (14 \div 7.5)$ A1 for answer in the range 61.7 to 62

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8.		360	6	<p>M1 for $3x + 1 + 3x + 1 + x + 3x - 2$ (or equivalent) ($= 10x$) or $4x - 5 + 4x - 5 + 2x - 3 + 2x - 3$ (or equivalent) ($= 12x - 16$)</p> <p>M1 for equating perimeters, e.g. $10x = 12x - 16$ or $2x = 16$</p> <p>A1 for $(x =) 8$</p> <p>M1 (dep M1) for $3 \times "8" - 2$ ($=22$) or $4 \times "8" - 2$ ($=30$) (or equivalent), provided "x" > 0</p> <p>M1 for $0.5 \times 24 \times ("8" + "22")$ (or equivalent), provided "x" > 0</p> <p>A1 for 360</p>
9.		$x = 130$	4	M1 for angle $BFG = 65$ may be seen on diagram

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		+ correct reasons		<p>M1 (dep) for correct method to calculate x, eg $(x=) 65 + 65 (=130)$ or $(x=) 180 - (180 - 2 \times 65) (=130)$</p> <p>C2 for $x \equiv 130$ and full appropriate reasons related to method shown</p> <p>(C1 (dep on M1) for any one appropriate reason related to method shown)</p> <p>eg <u>alternate angles</u>; <u>base angles in an isosceles triangle are equal</u>; <u>angles in a triangle add up to 180°</u>; <u>angles on a straight line add up to 180°</u>; <u>exterior angle of triangle = sum of two interior opposite angles</u>; <u>co-interior angles add up to 180° (allied angles)</u></p> <p>NB Any reasons stated must be used</p>
10.	$5 \times (360 \div 12) (= 150)$ $(AB^2 \Rightarrow) 10^2 + 7^2 - 2 \times 10 \times 7 \times \cos ("150")$ $(AB^2 \Rightarrow) 149 - 140 \cos ("150")$ $(AB^2 \Rightarrow) 270.24\dots$	16.4	4	<p>M1 Angle AOB.</p> <p>M1 Accept the use of the cosine rule with any angle but sides (10 and 7) must be in correct places.</p> <p>A1 (awrt) 270</p> <p>A1 (awrt) 16.4</p>
11.		correct graph	2	M1 for 5 or 6 or 7 points plotted correctly at the ends of the

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		No with supporting figures	2	intervals A1 cao for correct graph with points joined by curve or straight line segments M1 for $0.1 \times 200 (=20)$ or $0.9 \times 200 (= 180)$ or sight of 180 used on cf axis or $200 - 186 (=14)$ A1 ft for correct decision with 20 and “9” or 20 and 14 or “age” from reading graph at 180 OR M1 for method to find percentage of workers who are over 65, e.g. $\frac{200 - \text{“191”}}{200} \times 100 (= 4.5\%)$ or method to find percentage of workers who are over 60 (from table), e.g. $\frac{200 - 186}{200} \times 100 (= 7\%)$ or $\frac{200 - 190}{200} \times 100 (= 5\%)$ A1 ft for correct decision with “4.5”% or 7% or 5%
12.	e.g. $70\% = 17920$	25600	3	M1 $100\% - 30\%$, or 70% or $1 - 0.3$ or 0.7

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	$1\% = \frac{17920}{70} (= 256)$ $100\% = \frac{17920}{70} \times 100$			M1 for $\frac{17920}{70} \times 100$ or $\frac{17920}{0.7}$ A1 cao	
13.		$\frac{17}{40}$	3	M1 $\frac{4}{5} \times \frac{3}{8}$ or $\frac{1}{5} \times \frac{5}{8}$ or $\frac{12}{40}$ or $\frac{5}{40}$ M1 $\frac{4}{5} \times \frac{3}{8} + \frac{1}{5} \times \frac{5}{8}$ A1 $\frac{17}{40}$ (or equivalent)	
14.	(a)	$\frac{1}{2}(3x + 1 + 5x + 3)(2x + 3) =$	Proof	3	M1for correct method to find area of trapezium

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	$\frac{1}{2}(8x + 4)(2x + 3)$ So, $(4x + 2)(2x + 3) - 46 = 0$ $8x^2 + 16x + 6 - 46 = 0$ $8x^2 + 16x - 40 = 0$ $x^2 + 2x - 5 = 0$ (b) $x = \frac{-2 \pm \sqrt{2^2 - 4(1)(-5)}}{2 \times 1}$ $= \frac{-2 \pm \sqrt{24}}{2}$ OR $(x + 1)^2 - 1^2 - 5$ $= (x + 1)^2 - 6$ $x + 1 = \pm \sqrt{6}$	1.45, -3.45	3	M1 (dep) for expanding all brackets to get a correct expression for the area C1 for complete correct proof M1 for $\frac{-2 \pm \sqrt{2^2 - 4(1)(-5)}}{2 \times 1}$ condone one sign error in substitution M1 for $\frac{-2 \pm \sqrt{24}}{2}$ A1 for 1.44 to 1.45 (and -3.44 to -3.45) OR M1 for $(x + 1)^2 - 1^2 - 5$ (or equivalent) M1 for $x + 1 = (\pm)\sqrt{6}$ A1 for 1.44 to 1.45 (and -3.44 to -3.45)
15.	(a)	$y = f(x - 5)$	1	B1 cao

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(b)		(4, 3)	2	B2 cao (B1 for one coord. correct (in correct position) or (3,4).)
16.	$x = 0.0151515\dots$ $1000x = 15.151515\dots$ $10x = 0.151515\dots$ $990x = 15$ $x = \frac{15}{990} = \frac{1}{66}$ OR $100x = 1.51515\dots$ $x = 0.01515\dots 99x = 1.5$ $x = \frac{1.5}{99}$ $= \frac{15}{990} = \frac{1}{66}$	Proof	3	M1 for $(x =) 0.0151515(\dots)$ or $1000x = 15.151515(\dots)$ or $100x = 1.51515(\dots)$ or $10x = 0.151515(\dots)$ M1 for two recurring decimals the difference of which is a rational number C1 (dep on M2 scored) for completing the proof by subtracting and cancelling to give a correct fraction

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17.	$P = \frac{k}{x^2}$ $6 = \frac{k}{5^2} \quad (k = 150)$ $P = \frac{150}{8^2}$	2.34	3	M1 for $P = \frac{k}{x^2}$ or $P \propto \frac{1}{x^2}$ M1 for $6 = \frac{k}{5^2}$ or $(k =) 150$ seen or $6 \times 5^2 = P \times 8^2$ A1 2.34
18.		11	3	M1 for tangent drawn at $t = 2$ M1 (dep) for $\frac{\text{diff } y}{\text{diff } x}$ ft from tangent A1 for answer in range 9 – 14
19.		Yes, average speed could have been as high as 80.622...	5	B1 for 4535 or 4534.999... or 202.5 M1 for 4535 ((or equivalent)) \div 202.5 M1 for $\times 3600$ and $\div 1000$ A1 for 80.622... C1 (dep on first M1) for correct conclusion from their calculations

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20.		$2n^2 + 5n$	3	M1 for correct deduction from differences, e.g. 2nd difference of 4 implies $2n^2$ M1 for use of first differences A1
21.		$\sqrt{10}$	5	M1 method to find $g^{-1}(x)$ A1 $g^{-1}(x) = \frac{3x}{4+x}$ M1 $3x = (2x+5)(4+x)$ M1 correct expansion of brackets A1

Practice Papers Set 2 2H: National performance data from Results Plus

Qu No	Source of questions				Topic	Max score	Mean % all	ALL	Mean score of students achieving grade:						
	Spec	Paper	Session YMM	Qu					A*	A	B	C	D	E	
1				NEW	Compound measures	3									
2	5AM1	1H	1506	Q13	Factors, multiples, primes	4	63	2.51	3.68	3.26	2.58	1.71	0.81	0.36	
3	5MM2	2F	1206	Q27	Pythagoras in 2D	3	11	0.34				1.21	0.34	0.08	
4	5MM2	2H	1111	Q06	Ratio	5	60	3.02	4.53	3.91	3.32	2.15	1.26	1.33	
5	1380	2H	1106	Q05	Area of a circle	3	59	1.78	2.97	2.77	2.03	0.92	0.24	0.07	
6	5AM1	1H	1406	Q11	Simultaneous equations	4	71	2.83	3.93	3.83	3.26	1.94	0.67	0.13	
7	5MM2	2H	1306	Q15	Trigonometry	3	56	1.68	2.94	2.65	1.80	0.81	0.16	0.00	
8	5AM1	1H	1506	Q14	Solve linear equations	6	54	3.23	5.74	4.93	3.24	1.20	0.37	0.21	
9	1MA0	1H	1411	Q08	Angles	4	24	0.95	3.31	2.82	2.05	1.02	0.42	0.13	
10	4MA0	2H	1401	Q17	Sine and cosine rule	4	49	1.96	3.63	2.48	0.96	0.22	0.01	0.00	
11	1MA0	1H	1411	Q16	Cumulative frequency diagrams	4	47	1.88	3.76	3.40	2.88	2.07	1.39	0.89	
12	5MM2	2H	1111	Q11	Reverse percentages	3	48	1.43	2.86	2.57	1.47	0.77	0.08	0.00	
13	5AM2	2H	1311	Q21	Selection with or without replacement	3	44	1.32	2.74	2.06	1.47	0.59	0.22	0.00	
14	5MM2	2H	1406	Q26	Solve quadratic equations	6	42	2.54	5.73	4.65	2.27	0.63	0.12	0.03	
15	1380	2H	1006	Q27	Transformation of functions	3	29	0.88	2.22	1.28	0.68	0.46	0.29	0.20	
16	5MM2	2H	1306	Q20	Recurring decimals	3	25	0.75	2.16	1.19	0.53	0.18	0.05	0.02	
17	5MM2	2H	1111	Q23	Direct and indirect proportion	3	20	0.60	2.72	1.37	0.25	0.07	0.00	0.00	
18	5AM2	2H	1111	Q23	Gradients as rate of change	3	14	0.43	3.00	1.14	0.30	0.00	0.00	0.00	
19	1MA0	2H	1411	Q23	Compound measures	5	4	0.19	3.30	1.57	0.38	0.03	0.00	0.00	
20				NEW	Quadratic sequences	3									
21				NEW	Functions	5									
						80									