1MA1 Practice papers Set 2: Paper 2H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.			4.2	3	M1 1500 ÷ (100 × 100) (= 0.15) M1 28 × "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 2×2×2×3×5×5 A1 cao (SC B2 for 24*k*, 50*k*, 75*k*)
	(ii)		600		B1 for 600 (or ft 600*k*)

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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.		$\pi(6)^2 - \pi(5)^2$ $= 113(.09\ldots) - 78.5(39\ldots)$ $=34.55751919$	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 = cost (p) of an apple p = 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.		$\tan x = 14 \div 7.5 = 1.8666\ldots$ $\tan^{-1} 1.8666\ldots$	62	3	M1 for $\tan x = 14 \div 7.5$ (= 1.86666…) 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	M1 for $3x + 1 + 3x + 1 + x + 3x - 2$ (or equivalent) $(= 10x)$ or $4x - 5 + 4x - 5 + 2x - 3 + 2x - 3$ (or equivalent) $(= 12x - 16)$ M1 for equating perimeters, e.g. $10x = 12x - 16$ or $2x = 16$ A1 for $(x =)$ 8 M1 (dep M1) for $3 \times$ "8"-2 (=22) or $4 \times$ "8"-2 (=30) (or equivalent), provided "x" > 0 M1 for $0.5 \times 24 \times$ ("8" + "22") (or equivalent), provided "x" > 0 A1 for 360

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9.			$x = 130$ + correct reasons	4	M1 for angle $BFG = 65$ may be seen on diagram M1 (dep) for correct method to calculate x, eg (x=) 65 + 65 (=130) **or** (x=) 180 − (180 – 2 × 65) (=130) C2 for $x = 130$ **and** full appropriate reasons related to method shown (C1 (dep on M1) for any one appropriate reason related to method shown) eg alternate angles; base angles in an isosceles triangle are equal; angles in a triangle add up to 180°; angles on a straight line add up to 180°; exterior angle of triangle = sum of two interior opposite angles; co-interior angles add up to 180° (allied angles) NB Any reasons stated **must** be used
10.		5 x (360 ÷ 12) (= 150) (AB^2 =) $10^2 + 7^2 – 2 \times 10 \times 7 \times \cos$ (“150”) (AB^2 =) 149 – 140 cos (“150”) (AB^2 =) 270.24...	16.4	4	M1 Angle AOB. M1 Accept the use of the cosine rule with any angle but sides (10 and 7) must be in correct places. A1 (awrt) 270 A1 (awrt) 16.4

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11.			correct graph	2	M1 for 5 or 6 or 7 points plotted correctly at the ends of the intervals A1 cao for correct graph with points joined by curve or straight line segments
			No with supporting figures	2	M1 for 0.1 × 200 (=20) **or** 0.9 × 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. $\frac{200-"191"}{200} \times 100$ (= 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%

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12.		e.g. 70% = 17920 1% = $\frac{17920}{70}$ (= 256) 100% = $\frac{17920}{70} \times 100$	25600	3	M1 100% – 30%, or 70% or 1 – 0.3 or 0.7 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)

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Question		**Working**	**Answer**	**Mark**	**Notes**
14.	(a)	½(3x + 1 + 5x + 3)(2x + 3) = ½ (8x + 4)(2x + 3) So, (4x + 2)(2x + 3) – 46 = 0 $8x^2 + 16x + 6 - 46 = 0$ $8x^2 + 16x - 40 = 0$ $x^2 + 2x - 5 = 0$	Proof	3	M1for correct method to find area of trapezium M1 (dep) for expanding all brackets to get a correct expression for the area C1 for complete correct proof
	(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 for $\frac{-2 \pm \sqrt{2^2 - 4(1)(-5)}}{2 \times 1}$ condone one sign error in substitution M1for $\frac{-2 \pm \sqrt{24}}{2}$ A1for 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)

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Question		**Working**	**Answer**	**Mark**	**Notes**
15.	(a)		$y = f(x - 5)$	1	B1 cao
	(b)		(4, 3)	2	B2 cao (B1 for one coord. correct (in correct position) or (3,4).)
16.		$x = 0.0151515...$ $1000x = 15.151515...$ $10x = 0.151515\ldots.$ $990x = 15$ $x = \frac{15}{990} = \frac{1}{66}$ **OR** $100x = 1.51515...$ $x = 0.01515...99x = 1.5$ $x = \frac{1.5}{99}$ $= \frac{15}{990} = \frac{1}{66}$	Proof	3	M1 for ($x =$) $0.0151515(...)$ or $1000x = 5.151515(\ldots)$ or $00x = 1.51515(...)$ or $10x = 0.151515(\ldots)$ 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.		$P = \frac{k}{x^2}$ $6 = \frac{k}{5^2}$ ($k = 150$) $P = \frac{150}{8^2}$	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 $\frac{diff\ y}{diff\ x}$ 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)) ÷ 202.5 M1 for ×3600 and ÷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**

	Source of questions								Mean score of students achieving grade:					
Qu No	**Spec**	**Paper**	**Session YYMM**	**Qu**	**Topic**	**Max score**	**Mean % all**	**ALL**	**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								