1MA1 Practice papers Set 4: Paper 1H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.		$2^5 = 32 = 2^5$ $64^{\frac{1}{2}} = 8 = 2^3$ $4^3 = 64 = 2^6$ $8^{\frac{1}{3}} = 2$ $16 = 2^4$ $64^0 = 1 = 2^0$	64^0 $8^{\frac{1}{3}}$ $64^{\frac{1}{2}}$ 16 2^5 4^3	3	M1 for writing numbers as whole numbers or as consistent powers with a least 3 correct. M1 for writing numbers as whole numbers or as consistent powers with a least 5 correct. A1 for correct order with no incorrect statements.
2.			7	4	M1 for 1 – 0.4 – 0.3 – 0.16 or 100 – 40 – 30 – 16 A1 for 0.14 oe M1 for "0.14" × 50 oe A1 for 7 or ft "0.14" × 50
3.		Acton after 24, 48, 72, 96, 120 Barton after 20, 40, 60, 80, 100, 120 LCM of 20 and 24 is 120 9:00 a.m. + 120 minutes	11:00 a.m.	3	M1 for listing multiples of 20 and 24 with at least 3 numbers in each list ; multiples could be given in minutes or in hours and minutes (condone one addition error in total in first 3 numbers in lists) A1 identify 120 (mins) **or** 2 (hours) as LCM A1 for 11:00 (a.m.) **or** 11 (a.m.) **or** 11 o'clock

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4.		$(2x - 3 + 2x + 3) \div 2 \times 4 = 18$ $8x = 18$ $x = 2.25$ $P = 2x - 3 + 2x + 3 + 5 + 5$ $P = 4x + 10$ $P = 9 + 10$	19 cm	6	M1 for $(2x - 3 + 2x + 3) \div 2 \times 4$ oe M1 for equating "$(2x - 3 + 2x + 3) \div 2 \times 4$" = 18 A1 cao $x = 2.25$ oe (eg. $\frac{18}{8}$) M1 (indep) $2x - 3 + 2x + 3 + 5 + 5$ (= 4x + 10) oe M1 (dep) for substituting "x" into an expression for the perimeter A1 cao
5.			£500	3	M1 for 70% = 350 or $\frac{350}{70}$ M1 for $\frac{350}{70} \times 100$ oe A1 cao
6.		$\frac{7 \times 200}{0.05} = \frac{1400}{0.05}$	28000	3	B1 for any two of 7, 200 or 0.05 M1 for correct processing of at least two of 7, 200 or 190 and 0.05 or 0.1 A1 in the range 26600 – 28000

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7.		$(7 \times 2 + 2 \times 5) \times 200 = 4800$ 4800×8	38 400 g	5	M1 for 7×2 or 2×5 or 7×7 or 5×5 or 2×2 M1 for "7×2" + "2×5" oe or "7×7" – " 5×5" M1 (dep on 1st M) for '24' × 200 or '0.0024' × 2 M1 for '4800' × 8 or '0.0048' × 8 000 000 or '0.0048' × 8000 A1 for 38 400g or 38.4kg
8.			$y = \frac{1}{2}x - 5$	3	M1 for method to find gradient of L_1 e.g $\frac{6-3}{6-0}$ $\left(=\frac{1}{2}\right)$ M1 for $y =$ "$\frac{1}{2}$"$x + c$ or $y = mx - 5$ (c, m do not have to be numerical, or correct numerical values) or for $(L =)\frac{1}{2}x - 5$ A1 $y = \frac{1}{2}x - 5$ oe
9.	(a)	1, 2, 3, 5, 6, 9, 10, 11	$\frac{8}{11}$	2	M1 for indicating A $\cup$ B (could be by listing or shading etc) A1 for $\frac{8}{11}$
	(b)	1, 3, 4, 6, 7, 8, 11	$\frac{7}{11}$	2	M1 for indicating B^l(could be by listing or shading etc) A1 for $\frac{7}{11}$

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10.	(a)		reflection in $x = 5$	2	B1 for reflection B1 for $x = 5$
	(b)		rectangle with vertices (1, 3),(1, 6), (7, 6), (7, 3)	2	M1 for enlargement sf 3 A1 for fully correct answer
	(c)		90° clockwise, centre (0, 0)	3	B2 90° clockwise or 270° anticlockwise (B1 90° or 270° stated without direction or with incorrect direction or correct translation of S shown) B1 centre (0,0)
11.			(4,3), (4,4), (4,5), (5.4) marked	3	M2 for identifying the correct region or at least 3 correct points with no more than 3 incorrect points (M1 for drawing $x = 3$ (solid or dashed line) or at least 1 correct point with no more than 3 incorrect points) A1 cao

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12.			62	4	M1 for B to C time = 210 ÷ 70 (= 3 h) M1 for A to B dist = (5 − "3") × 50 (= 100) M1 (dep on M1) for average speed = total distance ÷ total time or 210 + "(2 × 50)" ÷ 5 A1 cao
13.			128°	4	M1 for 180 – 116 (= 64), when clearly attempting to find angle *ADC* M1 (indep) for their angle *ADC* × 2 C2 (dep on M2) for *x* = 128(°) and fully correct reasons supported by method: eg. "opposite angles of a cyclic quadrilateral add up to 180°" and "the angle at the centre of a circle is twice the angle at the circumference" [C1 (dep on the relevant M1) for one correct reason]

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14.	(a)	$4^2 + 3 \times 4 - 2$	26	2	M1 for substituting 4 into the expression, e.g. $4^2 + 3 \times 4 - 2$ A1 cao
	(b)	1 7 17 31 49 6 10 14 18 4 4 4 $2n^2 + c$	$2n^2 - 1$	3	M1 for correct method to find second differences M1(dep) for $2n^2 + bn + c$ A1 for $2n^2 - 1$
15.		50 1 1 1 50 1 1 1 50	$\frac{126}{720}$	4	M1 for 3 fractions $\frac{a}{10}$, $\frac{b}{9}$, $\frac{c}{8}$ where $a < 10$, $b < 9$ and $c < 8$ M1 for $\frac{7}{10} \times \frac{3}{9} \times \frac{2}{8}$ or $\frac{3}{10} \times \frac{7}{9} \times \frac{2}{8}$ or $\frac{3}{10} \times \frac{2}{9} \times \frac{7}{8}$ $(=\frac{42}{720})$ M1 for $\frac{7}{10} \times \frac{3}{9} \times \frac{2}{8} + \frac{3}{10} \times \frac{7}{9} \times \frac{2}{8} + \frac{3}{10} \times \frac{2}{9} \times \frac{7}{8}$ or $3 \times \frac{3}{10} \times \frac{2}{9} \times \frac{7}{8}$ A1 for $\frac{126}{720}$ (oe, e,g. $\frac{7}{40}$)

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16.		$M = kL^3$ $k = \frac{M}{L^3} = \frac{160}{8} = 20$ When $L = 3$, $M = 20 \times 3^3$	540	4	M1 for $M \propto L^3$ or $M = kL^3$ A1 $k = 20$ M1 for '20' $\times 3^3$ A1 for 540 (cao)
17.			$x = 4$, $x = 0$	4	M1 for $x^2 - 2x + 1 - 2x + 2 - 3 = 0$; condone one sign error in the complete expansion M1 for $x^2 - 4x = 0$ M1 (dep on M1) for a correct method to solve their quadratic equation, e.g. $x(x - 4) = 0$ A1 cao for $x = 4$ and $x = 0$

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18.	(a)		$\mathbf{b} - \mathbf{a}$	1	B1
	(b)		$\overrightarrow{BM} = \frac{1}{2}\overrightarrow{OC}$ hence parallel	4	B1 $\overrightarrow{OC} = \mathbf{a} + \mathbf{b}$ M1 $\overrightarrow{BM} = \overrightarrow{BC} + \overrightarrow{CM}$ oe or $\overrightarrow{BM} = \mathbf{a} + \frac{1}{2}$("$\mathbf{b} - \mathbf{a}$") A1 $\frac{1}{2}(\mathbf{a} + \mathbf{b})$ C1 $\overrightarrow{BM} = \frac{1}{2}\overrightarrow{OC}$ hence parallel
19.		$x^2 + (x + 1)^2$ $= x^2 + x^2 + 2x + 1$ $= 2x^2 + 2x + 1$ = even + even + odd = odd	proof	3	M1 for $x^2 + (x + 1)^2$ or $(x - 1)^2 + x^2$ oe M1 for correctly expanding $(x + 1)^2$or$(x - 1)^2$ C1 for simplifying correctly and for final explanation and states x is an integer, e.g. $2(x^2 + x)$ is even and 1 is odd **and e**ven + odd is odd

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20.		$\frac{8-\sqrt{18}}{\sqrt{2}} = \frac{8}{\sqrt{2}} - \frac{\sqrt{18}}{\sqrt{2}}$ $= \frac{8}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} - \sqrt{\frac{18}{2}}$ $\frac{8\sqrt{2}}{2} - 3$	$a = -3$ $b = 4$	3	M1 for attempt to rationalise denominator, e.g. $\frac{8}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} - \frac{\sqrt{18}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$ or $\frac{8-\sqrt{18}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$ Or $8 - \sqrt{18} = \sqrt{2}(a + b\sqrt{2})$ (oe) A2 for $-3 + 4\sqrt{2}$ (A1 for -3, A1 for 4)

National performance data from Results Plus

	Original source of questions						Mean score of students achieving grade:						
Qn	Spec	Paper	Session YYMM	Qn	Topic	Max score	ALL	A*	A	B	C	D	E
1	5MM1	1H	1506	Q17	Index laws	3	2.01	2.92	2.71	2.15	1.26	0.56	0.27
2	5MM1	1H	1411	Q07	Probability	4	2.85	3.61	3.55	3.18	2.59	1.92	0.80
3	1MA0	1H	1206	Q07	HCF and LCM	3	2.00	2.77	2.43	2.20	1.87	1.20	0.58
4	5MM1	1H	1106	Q14	Solve linear equations	6	2.02	5.71	4.15	2.19	0.50	0.30	0.14
5	1MA0	1H	1306	Q16	Percentages	3	1.02	2.79	2.07	1.28	0.60	0.20	0.10
6	1380	1H	906	Q14	Estimation	3	1.61	2.54	2.00	1.59	1.25	0.77	0.33
7	1380	1H	1106	Q10	Compound measures	5	2.20	4.13	3.30	2.31	1.22	0.51	0.29
8	1MA0	1H	1406	Q19	Gradients	3	0.62	2.65	1.76	0.56	0.08	0.01	0.00
9	5MM1	1H	1206	Q17	Venn diagrams	4	1.26	2.68	1.84	0.92	0.53	0.25	0.07
10	5MM1	1F	1311	Q26	Transformations	7	1.69	6.00	5.00	4.00	3.43	2.25	1.36
11	1MA0	1H	1211	Q17	Solve inequalities	3	0.28	2.37	1.24	0.31	0.06	0.02	0.02
12	2MB01	2H	1406	Q13	Average speed	4	1.96	3.60	2.89	2.29	1.57	0.65	0.27
13	2MB01	3H	1311	Q18	Circle theorems	4	1.66	3.44	2.80	1.72	0.71	0.23	0.06
14	5MM1	1H	1311	Q14	Number sequences	5	2.27	4.76	3.70	2.72	1.33	0.37	0.12
15	1MA0	1H	1306	Q26	Selection with and without replacement	4	0.63	3.04	1.78	0.61	0.11	0.01	0.00
16	1380	1H	906	Q21	Direct and inverse proportion	4	1.81	3.88	3.27	1.62	0.51	0.10	0.03
17	5MM1	1H	1411	Q20	Solve quadratic equations	4	0.92	3.72	1.80	0.70	0.11	0.00	0.00
18	5MM1	1H	1306	Q24	Vectors	5	1.24	3.63	1.94	0.96	0.32	0.06	0.00
19	5MM1	1H	1206	Q24	Algebraic proof	3	0.53	2.09	0.96	0.20	0.03	0.00	0.00
20	1380	1H	1106	Q22b	Surds	3	0.27	1.30	0.38	0.12	0.06	0.04	0.03
						80							