1MA1 Practice papers Set 2: Paper 1H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.		$(7 \times 2 + 2 \times 5) \times 200 = 4800$ 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' (or equivalent) or '7×7' – '5×5' M1(dep on first 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 (SC B3 for any answer including digits 384)
2.	(a)		13:30	M1 M1 A1	90 ÷ 1.5 (= 60) 240 ÷ 60 (= 4 hours)
	(b)		Assumption and effect	C1	e.g. assumed constant speed – if not constant than could arrive earlier or later Assumed no stops – if stop then will arrive later

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3.		$4000 - (\frac{10}{100} \cdot 4000) =$ 3600 $3600 - (\frac{10}{100} \cdot 3600)$	3240	3	M1 for $4000 - \frac{10}{100}$ or 0.9×4000 (or equivalent) or 3600 or 400 or 3200 or 800 seen M1 (dep) 10 "3600" $- \frac{10}{100} \cdot$ "3600" or "3600" $\times$ 0.9 (or equivalent) A1 cao **or** M2 for 29.04000×0.9^2 (M1 for 4000×0.9^3) A1 cao [SC: B2 for an answer of £4840, with or without working]

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4.			25	4	M1 for 600 ÷ 4 (=150) M1 for 4500 ÷ "150" (=30) M1 for 750 ÷ "30" A1 for 25 with supporting working **OR** M1 for 4500 ÷ 750 (=6) or 750 ÷ 4500 (= $\frac{1}{6}$) M1 for 600 ÷ 4 (=150) or 600 ÷ "6" (=100) or 600 × $\frac{1}{6}$ (=100) M1 for "150" ÷ "6" or "100" ÷ 4 or 150 × $\frac{1}{6}$ A1 for 25 with supporting working **OR** M1 for 4500 ÷ 750 (=6) or 750 ÷ 4500 (= $\frac{1}{6}$) M1 for $\frac{1}{4} \cdot \frac{1}{6} \left(= \frac{1}{24} \right)$ M1 for $\frac{1}{24} \cdot 600$ A1 for 25 with supporting working

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5.			48	5	M1 for 8 – 2 (= 6) M1 (indep) for $x^2 + 8^2$ (provided $x \leq 8$) M1 (dep on previous M1) for $\sqrt{(x^2 + 8)}$ or $\sqrt{100}$ M1 (dep on M2) for 4 × 2 + 4 × "10" A1 cao
6.		0.38×10^{-1}, 3800×10^{-4}, 0.038×10^{2}, 380	Correct order	2	M1 changing any one correctly or at least 3 in the correct order (ignoring one) or reverse order A1 for correct order (accept any form)
7.		$6 + 3 = n + 5$ OR $64 \times 8 = 32 \times 2^n$	4	2	M1 for $6 + 3 - n = 5$ (or equivalent) or $(64 \times 8) \div 2^n = 32$ (or equivalent) or 2^{6+3} (or equivalent) seen A1 cao
8.		$-3 \leq y < 2.5$	–3, –2, –1, 0, 1, 2	3	M1 for dividing a list of integers by 2 or for $y \geq -3$ and/or $y < \frac{5}{2}$ seen or implied A2 for all integers correct (A1 for 5 correct with no more than one extra)

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9.		HCF: The numbers must be $3n$ and $3m$ where n and m are co-prime and at most one is a multiple of 3 LCM: Factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, 36	9, 12	2	B2 cao (B1 for two numbers with HCF of 3 or LCM of 36)
10.			Vertices at (3, 2), (3, 4) and (4, 2)	3	M1 for centre (2, 0) marked M1 for all sides × ½ A1 cao SC B2 for correct enlargement from (2, 0), scale factor $\neq 0.5$ or for correct enlargement from (0, 2), scale factor = 0.5

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Question		**Working**	**Answer**	**Mark**	**Notes**
11.	(a)	<table><tr><td>F</td><td>15</td><td>25</td><td>36</td><td>24</td></tr><tr><td>Fd</td><td>3</td><td>5</td><td>3.6</td><td>1.2</td></tr></table>	Correct histogram	3	B3 for fully correct histogram (overlay) (B2 for 3 correct blocks) (B1 for 2 correct blocks of different widths) SC : B1 for correct key, eg. 1 cm^2 = 5 (cars) **or** correct values for (freq ÷ class interval) for at least 3 frequencies (3, 5, 3.6, 1.2)
	(b)	$\frac{3}{4} \times 24$	18	2	M1 for $\frac{3}{4} \times 24$ (= 18) (or equivalent) **or** $\frac{1}{4} \times 24 (= 6)$ (or equivalent) A1 cao **OR** M1 ft histogram for 15 × “1.2” **or** 5 × "1.2" A1 ft

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12.	(a)	$\frac{(x+4)(x-1)}{(2x-3)(x-1)}$	$\frac{x+4}{2x-3}$	3	M1 for $(x + 4)(x – 1)$ M1 for $(2x – 3)(x – 1)$ A1 cao
	(b)	$\frac{4(x-2)}{(x+2)(x-2)} + \frac{3(x+2)}{(x+2)(x-}$	$\frac{7x-2}{(x+2)(x-2)}$	3	M1 for denominator $(x + 2)(x – 2)$ (or equivalent) **or** $x^2 – 4$ M1 for $\frac{4(x-2)}{(x+2)(x-2)}$ (or equivalent) **or** $\frac{3(x+2)}{(x+2)(x-2)}$ (or equivalent) (NB. The denominator must be $(x + 2)(x – 2)$ **or** $x^2 – 4$ **or** another suitable common denominator) A1 for $\frac{7x-2}{(x+2)(x-2)}$ **or** $\frac{7x-2}{x^2-4}$ SC: If no marks awarded then award B1 for $\frac{4(x-2)}{x^2-2} + \frac{3(x+2)}{x^2-2}$ (or equivalent)
13.			75π	3	M1 for $(4 \times \pi \times 5^2) \div 2$ (or equivalent) M1 for $\pi \times 5^2$ (or equivalent) A1 for 75π (accept 235.5)

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14.		$\frac{8}{20}\times\frac{12}{19}+\frac{12}{20}\times\frac{8}{19}$	$\frac{192}{380}$	4	B1 for $\frac{8}{19}$ or $\frac{12}{19}$ M1 for $\frac{8}{20}\times\frac{12}{19}$ or $\frac{12}{20}\times\frac{8}{19}$ M1 for $\frac{8}{20}\times\frac{12}{19}+\frac{12}{20}\times\frac{8}{19}$ or $2\times\frac{8}{20}\times\frac{12}{19}$ A1 for $\frac{192}{380}$ (or equivalent)
		$\frac{8}{20}\times\frac{12}{20}+\frac{12}{20}\times\frac{8}{20}=$ $=\frac{192}{400}\ (=0.48)$			**With replacement** M1 for $\frac{8}{20}\times\frac{12}{20}$ or $\frac{12}{20}\times\frac{8}{20}$ M1 for $\frac{8}{20}\times\frac{12}{20}+\frac{12}{20}\times\frac{8}{20}$ or $2\times\frac{8}{20}\times\frac{12}{20}$
		OR $1-(\frac{8}{20}\times\frac{7}{20}+\frac{12}{20}\times\frac{11}{20})$ $=\frac{212}{400}\ (=0.53)$			OR M1 for $\frac{8}{20}\times\frac{7}{20}+\frac{12}{20}\times\frac{11}{20}$ M1 for $1-\frac{188}{400}$

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15.			Correct proof	4	M1 expands $(n-1)^2$ with at least three out of four terms correct **or** $n^2 - n - n + 1$ **or** $n^2 - 2n + 1$ M1 $n^2 - 1 + n^2 - n - n + 1$ **or** $2n^2 - 2n$ A1 $2(n^2 - n)$ **or** $2n(n-1)$ C1 (dep on M1) for conclusion $2 \times$ '$(n^2 - n)$' or $2 \times n \times$ '$(n-1)$' is always even OR M1 factorises $n^2 - 1$ correctly $(n-1)(n+1)$ M1 $(n-1)(n+1+n-1)$ A1 $2n(n-1)$ C1 (dep on M1) for conclusion $2 \times$ '$(n^2 - n)$' or $2 \times n \times$ '$(n-1)$' is always even

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Question		**Working**	**Answer**	**Mark**	**Notes**
16.	(a)	*AB* = *AC* (equilateral triangle) *AD* is common *ADC*=*ADB* (= 90° given) *ADBADC*Δ≡Δ (RHS) OR *DAC* = *DAB* (since *ACD* = *ABD* and *ADC* = *ADB*) *AB* = *AC* (equilateral triangle) *AD* is common *ADBADC*Δ≡Δ (SAS) OR *DAC* = *DAB* (since *ACD* = *ABD* and *ADC* = *ADB*) *AD* is common *ACD* = *ABD* (equilateral triangle) *ADBADC*Δ≡Δ (AAS)	Proof	3	M1 for any three correct statements (which do not have to be justified) that together lead to a congruence proof (ignore irrelevant statements) A1 for a full justification of these statements A1 for RHS, SAS, AAS, ASA or SSS as appropriate NB The two A marks are independent

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16.	(b)	$BD = DC$ (congruent Δs) $BC = AB$ (equilateral Δs) Hence $BD = \frac{1}{2}AB$	Proof	2	B1 for $BD = DC$ and $BC = AB$ B1 for justification of these statements and completion of proof
17.	(a)	$\frac{6}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$	$\frac{6\sqrt{5}}{5}$	2	M1 $\frac{6}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$ A1 cao
	(b)	$2\sqrt{5}+\sqrt{10}\ \sqrt{5}+$ $2\sqrt{20}+\sqrt{10}\ \sqrt{20}$ $2\sqrt{5}+\sqrt{50}+$ $2\sqrt{20}+\sqrt{200}$ $2\sqrt{5}+5\ \sqrt{2}\ +$ $4\sqrt{5}+10\sqrt{2}$	$6\sqrt{5}+15\sqrt{2}$	4	M1 for 3 of no more than 4 correct terms of expansion, (may be shown in a table or without + signs) $2\sqrt{5}\ +\ \sqrt{10}\ \sqrt{5}\ +\ 2\sqrt{20}\ +\ \sqrt{10}\ \sqrt{20}$ (or equivalent) M1 or $\sqrt{50}$ or $\sqrt{(10\times5)}$ or $\sqrt{200}$ or $\sqrt{(20\times10)}$ M1 $5\ \sqrt{2}$ or $10\sqrt{2}$ or $4\sqrt{5}$ A1 cao

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18.	(a)		Circle, centre O, radius 3	2	M1 for a complete circle centre (0, 0) A1 for a correct circle within guidelines
	(b)		$x = 2.6,\ y = -1.6$ or $x = -1.6,\ y = 2.6$	3	M1 for $x + y = 1$ drawn M1 (dep) ft from (a) for attempt to find coordinates for any one point of intersection with a curve or circle A1 for $x = 2.6, y = -1.6$ **and** $x = -1.6, y = 2.6$, all ± 0.1
19.	(a)	$P = \frac{k}{V} : 5 = \frac{k}{8}; k = 40$	$P = \frac{40}{V}$	3	M1 for $P \propto \frac{1}{V}$ **or** $P = \frac{k}{V}$, k algebraic M1 for subs $P = 5$ and $V = 8$ into $P = \frac{k}{V}$ A1 for $P = \frac{40}{V}$
	(b)	$P = \frac{40}{2}$	20	1	B1 ft on k for $P = \frac{'k'}{V}$
20.	(i)		(3, −1)	3	B1 cao
	(ii)		(1.5, −4)		B1 for (1.5, −4) accept 1.5 or $1\frac{1}{2}$ or $\frac{3}{2}$ for x coordinate
	(iii)		(−3, −4)		B1 cao

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21.				4	M1 for method to find gradient of AB, e.g. $\frac{6-0}{1--3}\left(=\frac{3}{2}\right)$ M1 for method to find gradient of line, e.g. $-1\div\frac{3}{2}\left(=-\frac{2}{3}\right)$ M1 for method to find y intercept, e.g. $2=-\frac{2}{3}\times 5+c$ or $c=\frac{16}{3}$
			$3y + 2x = 16$		A1

National performance data taken from Results Plus

Qu No	Spec	Paper	Session	Qu	Topic	Max score	Mean % all	ALL	A*	A	B	C	D	E
1	1380	1F	1106	Q29	Compound measures	5	10	0.52				1.25	0.58	0.27
2				NEW	Speed	4	No data available							
3	1380	1H	1006	Q19	Compound interest	3	70	2.09	2.90	2.65	2.20	1.59	0.96	0.58
4	1MA0	1H	1411	Q14	Ratio	4	31	1.23	3.63	3.20	2.46	1.34	0.65	0.24
5	1MA0	1H	1511	Q13	Derive expressions	3	8	0.23	2.42	1.67	0.87	0.22	0.08	0.05
6	1MA0	1H	1211	Q20	Standard form	2	60	1.20	1.91	1.80	1.61	1.20	0.73	0.46
7	5MM1	1H	1211	Q18	Index laws	2	70	1.40	1.81	1.90	1.57	1.20	1.20	0.00
8	1387	5H	711	Q14	Solve inequalities	3	63	1.89	2.83	2.47	1.73	0.76		
9	5MM1	1H	1211	Q11	HCF and LCM	2	39	0.77	1.81	1.00	0.62	0.49	0.33	0.00
10	5MM1	1H	1211	Q22	Enlargement	3	52	1.56	2.81	2.42	1.70	0.57	0.00	0.00
11	1MA0	1H	1206	Q22	Histograms and grouped frequency	5	27	1.34	4.31	2.98	1.36	0.39	0.09	0.02
12	1MA0	1H	1206	Q23	Simplify algebraic expressions	6	17	1.03	4.84	2.39	0.70	0.12	0.03	0.01
13	1MA0	1H	1303	Q23	Surface area	3	17	0.50	2.05	1.21	0.68	0.33	0.12	0.03
14	5MM1	1H	1211	Q21	Selection with or without replacement	4	34	1.36	3.38	2.90	1.25	0.45	0.13	0.00
15	5MM1	1H	1306	Q23	Algebraic proof	4	20	0.79	3.00	1.30	0.36	0.04	0.00	0.00
16	1380	1H	906	Q24	Geometric proof	5	11	0.53	2.25	0.97	0.26	0.07	0.02	0.01
17	5MM1	1H	1111	Q22	Surds	6	32	1.89	5.25	3.44	1.54	0.20	0.07	0.00
18	1380	1H	1011	Q28	Graphs of circles	5	12	0.60	3.57	1.24	0.38	0.11	0.03	0.02
19	1380	1H	1011	Q26	Direct and inverse proportion	4	15	0.58	3.33	1.52	0.35	0.05	0.01	0.01
20	1MA0	1H	1411	Q25	Transformation of functions	3	6	0.17	2.01	1.15	0.39	0.09	0.03	0.01
21				NEW		4	No data available							
						80								