

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

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Question	Working	Answer	Mark	Notes
1.	$(7 \times 2 + 2 \times 5) \times 200 =$ 4800 4800 \times 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 ' \times 200 or ' 0.0024 ' \times 2 M1 for ' 4800 ' \times 8 or ' 0.0048 ' \times 8 000 000 or ' 0.0048 ' \times 8000 A1 for 38 400g or 38.4kg (SC B3 for any answer including digits 384)
2.	(a)	13:30	M1	$90 \div 1.5 (= 60)$
			M1	$240 \div 60 (= 4 \text{ hours})$
			A1	
	(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.	$4000 - \left(\frac{10}{100} \times 4000\right) =$ 3600 $3600 - \left(\frac{10}{100} \times 3600\right)$	3240	3	<p>M1 for $4000 - \frac{10}{100}$ or 0.9×4000 (or equivalent) or 3600 or 400 or 3200 or 800 seen</p> <p>M1 (dep) 10 "3600" $-\frac{10}{100} \times$ "3600" or "3600"$\times 0.9$ (or equivalent) A1 cao</p> <p>or</p> <p>M2 for 29.04000×0.9^2</p> <p>(M1 for 4000×0.9^3)</p> <p>A1 cao</p> <p>[SC: B2 for an answer of £4840, with or without working]</p>

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4.		25	4	<p>M1 for $600 \div 4 (=150)$</p> <p>M1 for $4500 \div "150" (=30)$</p> <p>M1 for $750 \div "30"$</p> <p>A1 for 25 with supporting working</p> <p>OR</p> <p>M1 for $4500 \div 750 (=6)$ or $750 \div 4500 (= \frac{1}{6})$</p> <p>M1 for $600 \div 4 (=150)$ or $600 \div "6" (=100)$ or $600 \times \frac{1}{6} (=100)$</p> <p>M1 for $"150" \div "6"$ or $"100" \div 4$ or $150 \times \frac{1}{6}$</p> <p>A1 for 25 with supporting working</p> <p>OR</p> <p>M1 for $4500 \div 750 (=6)$ or $750 \div 4500 (= \frac{1}{6})$</p> <p>M1 for $\frac{1}{4} \times \frac{1}{6} (= \frac{1}{24})$</p> <p>M1 for $\frac{1}{24} \times 600$</p> <p>A1 for 25 with supporting working</p>

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5.			20	3	M1 for $30 \times 14 (=420)$ or $18 \times 10 (=180)$ M1 for $30 \times 14 - 18 \times 10$ or “420” – “180” (=240) 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.	<p>HCF: The numbers must be $3n$ and $3m$ where n and m are co-prime and at most one is a multiple of 3</p> <p>LCM: Factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, 36</p>	9, 12	2	<p>B2 cao</p> <p>(B1 for two numbers with HCF of 3 or LCM of 36)</p>
10.		<p>Vertices at (3, 2), (3, 4) and (4, 2)</p>	3	<p>M1 for centre (2, 0) marked</p> <p>M1 for all sides $\times \frac{1}{2}$</p> <p>A1 cao</p> <p>SC B2 for correct enlargement from (2, 0), scale factor $\neq 0.5$ or for correct enlargement from (0, 2), scale factor = 0.5</p>

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11.	(a)	<table border="1"> <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>				F	15	25	36	24	Fd	3	5	3.6	1.2	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)
F	15	25	36	24														
Fd	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)	$\frac{4(x-2)}{(x+2)(x-2)} + \frac{3(x+2)}{(x+2)(x-2)}$	$\frac{7x-2}{(x+2)(x-2)}$	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)

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				A1 for 75π (accept 235.5)
14.	$\frac{8}{20} \times \frac{12}{19} + \frac{12}{20} \times \frac{8}{19}$ $\frac{8}{20} \times \frac{12}{20} + \frac{12}{20} \times \frac{8}{20} =$ $= \frac{192}{400} (= 0.48)$ OR $1 - \left(\frac{8}{20} \times \frac{7}{20} + \frac{12}{20} \times \frac{11}{20} \right)$ $= \frac{212}{400} (= 0.53)$	$\frac{192}{380}$	4	A1 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) 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 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	<p>M1 expands $(n - 1)^2$ with at least three out of four terms correct or $n^2 - n - n + 1$ or $n^2 - 2n + 1$</p> <p>M1 $n^2 - 1 + n^2 - n - n + 1$ or $2n^2 - 2n$</p> <p>A1 $2(n^2 - n)$ or $2n(n - 1)$</p> <p>C1 (dep on M1) for conclusion $2 \times '(n^2 - n)'$ or $2 \times n \times '(n - 1)'$ is always even</p> <p>OR</p> <p>M1 factorises $n^2 - 1$ correctly $(n - 1)(n + 1)$</p> <p>M1 $(n - 1)(n + 1 + n - 1)$</p> <p>A1 $2n(n - 1)$</p> <p>C1 (dep on M1) for conclusion $2 \times '(n^2 - n)'$ or $2 \times n \times '(n - 1)'$ is always even</p>

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16.	(a)	<p>$AB = AC$ (equilateral triangle)</p> <p>AD is common</p> <p>$\angle ADC = \angle ADB$ ($= 90^\circ$ given)</p> <p>$\triangle ADC \cong \triangle ADB$ (RHS)</p> <p>OR</p> <p>$\angle DAC = \angle DAB$ (since $\angle ACD = \angle ABD$ and $\angle ADC = \angle ADB$)</p> <p>$AB = AC$ (equilateral triangle)</p> <p>AD is common</p> <p>$\triangle ADC \cong \triangle ADB$ (SAS)</p> <p>OR</p> <p>$\angle DAC = \angle DAB$ (since $\angle ACD = \angle ABD$ and $\angle ADC = \angle ADB$)</p>	Proof	3	<p>M1 for any three correct statements (which do not have to be justified) that together lead to a congruence proof (ignore irrelevant statements)</p> <p>A1 for a full justification of these statements</p> <p>A1 for RHS, SAS, AAS, ASA or SSS as appropriate</p> <p>NB The two A marks are independent</p>

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

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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

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	(ii)		(1, -4)		B1 cao
	(iii)		(-3, -4)		B1 cao
21.				4	<p>M1 for method to find gradient of AB, e.g. $\frac{6-0}{1--3} \left(= \frac{3}{2} \right)$</p> <p>M1 for method to find gradient of line, e.g. $-1 \div \frac{3}{2} \left(= -\frac{2}{3} \right)$</p> <p>M1 for method to find y intercept, e.g. $2 = -\frac{2}{3} \times 5 + c$ or $c = \frac{16}{3}$</p>
			$3y + 2x = 16$		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								