1MA1 Practice papers Set 4: Paper 2H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.	(a)		**5**, 0, −3, −4, **−3**, **0**, 5	2	B2 (B1 for two correct)
	(b)		Correct graph	2	B2 for the correct smooth curve B1 for at least 6 points from table plotted correctly provided at least B1 scored in (a)
2.			15.42	4	M1 for method to find litres needed for either car A (e.g. 450 ÷ 10.3 (= 43.69)) or car B (e.g. 450 ÷ 14.6 = (30.82)) M1 for method to find cost of fuel for either car A (e.g. 1.39 × 43.69 (= 6 0.73) or car B (e.g. 1.47 × 30.82 (= 45.31)) M1 (dep M2) or method to find difference in fuel costs for car A and B A1 cao
3.		$x + x - 5 + 2x < 30$ $x + x + 2x < 30 + 5$ $4x < 35$ $x < 35 \div 4$	8	4	M1 for $x - 5$ for Martin or $2x$ for James M1 (dep on M1) for $x +$ '$x - 5$' + '$2x$' $<$ 30 (or = 30) M1 (dep on M2) for complete correct method to solve their equality or inequality or 8.75 (oe) seen A1 cao

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4.		7200 ÷ 0.75 75% = 7200 1% = 7200 ÷ 75 = 96 100% = 96 × 100	9600	3	M2 for 7200 ÷ (1 – 0.25) A1 for 9600
5.			Yes	3	M1 for 1 − 0.6 (= 0.4) M1 for (“0.4”)^3 (oe) C1 (dep on M1) for 0.064 (oe) leading to a correct deduction
6.	(a) (b) (c) (d)		3, 6, 9 {2, 3, 4, 6, 8, 9,10} {6} 3, 9	1 1 1 2	B1 (condone {3, 6, 9}) B1 (condone omission of brackets) B1 (condone omission of brackets) B2 cao (B1 for one of 3, 9 with no incorrect numbers **or** 3, 6, 9)
7.			0, 1, 2	2	B2 for 0, 1, 2 (B1 for one error or one omission or one addition) OR B1 for (x =) –2, –1, 0, 1, 2 and (y =) 0, 1, 2, 3, 4 (oe),

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8.	(a)		Liz explanation	1	B1 Liz because she carried out most trials
	(b)	12 + 34 + 57 = 103 40 + 100 +300 103 ÷ 40	0.23 or $\frac{103}{440}$	2	M1 (12 + 34 + 57)/*b* where *b* > 103 or *a*/(12 + 28 + 34 + 66 + 57 + 243) where *a* < 440 A1 0.23or 0.234(09..) or $\frac{103}{440}$ (oe)
9.			32.2 (cm)	4	M1 for *BC* = $\frac{10}{4}$ × 5 (= 12.5) M1 for *EC* = $\frac{10}{4}$ × 5.8 – 5.8 (=8.7) M1(dep on at least M1) for '12.5' + '8.7' + 5 + 6 A1 cao

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10.		e.g. $4a + 3b = 250$ $3a + 4b = 240$ (×3) $12a + 9b = 750$ (×4) $12a + 16b = 960$ Subtract $7b = 210$ so $b = 30$ Substitute $4a + 90 = 250$ $4a = 250 – 90 = 160$	(i) 40 (ii) 30	5	B1 for correct equations expressed in terms of two variables (oe) M1 for correct process to eliminate either variable (condone one arithmetic error) A1 for either (£)0.4 or (£)0.3 (oe) M1 (dep on first M1) for correct substitution of their found variable A1 cao for both (i) 40 and (ii) 30
11.		**Years** **Value at end of year** 1 1.05 2 1.1025 3 1.157625 4 1.21550625 5 1.276281563 6 1.340095641 7 1.407100423 8 1.477455444 9 1.551328216 10 1.628894627 11 1.710339358 12 1.795856326 13 1.885649142 14 1.979931599 15 2.078928179	15	2	M1 for writing an equation e.g. $1.05^n = 2$ or for a correct method to find total value up to the end of at least year 5 or for at least 3 trials of n into 1.05^n or using n log 1.05 = log 2 A1 for 15 years

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12.			$\frac{17}{40}$	3	M1 $\frac{4}{5} \times \frac{3}{8}$ or $\frac{1}{5} \times \frac{5}{8}$ or $\frac{12}{40} \times \frac{5}{40}$ M1 $\frac{4}{5} \times \frac{3}{8} + \frac{1}{5} \times \frac{5}{8}$ A1 $\frac{17}{40}$ oe
13.		$50(2x - 10) - 35(x + 20) = 1725$ $100x - 500 - 35x - 700 = 1725$ $65x - 1200 = 1725$ $65x = 1725 + 1200 = 2925$ $x = 2925 \div 65 = 45$ (A =) $50 \times 80 = 4000$	4000	4	M1 for $50(2x - 10) - 35(x + 20) = 1725$ (oe) M1 for an attempt to reducing to the form $65x = b$, $b > 0$ or (x =) 45 M1 for $50 \times (2 \times$ "45" $- 10)$ or $35 \times$ ("45" $+ 20) + 1725$ A1 cao

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14.		*d*: UB = 190.5 (190.49..) LB = 189.5 *f*: UB = 25.75 (25.749..) LB = 25.65	7.4 because the LB and UB agree to that number of figures	5	B1 for one correct bound of *d* B1 for one correct bound of *f* M1 for a correct method to find the upper bound of *c*, e.g. "190.5" ÷ "25.65" (= 7.4269....) or for a correct method to find the lower bound of *c*, e.g. "189.5" ÷ "25.75" (= 7.359....) A1 for 7.42(69…) and 7.35(92…) C1 (dep on M1) for a statement that both LB and UB round to "7.4" to one decimal place oe
15.		*x* –3 –2 –1 0 1 2 3 *y* 0 5 8 9 8 5 0	36	4	M1 for attempting to find area under curve M1 for correct method to find the area under the curve between $x = -3$ and $x = 3$ (at least 3 areas) A2 for 35 – 36
16.			218	3	M1 for $1.2 \times 200 - 35$ (= 205) (oe) M1 for complete iterative method, e.g. 2 months: $1.2 \times$ "205" – 35 3 months: $1.2 \times$ "211"– 35 A1 for 218, accept 218.2

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17.	(a)	$\frac{1}{2}\times 11.6\times 8.7\times \sin 52^{o}$	39.8	2	M1 $\frac{1}{2}\times 11.6\times 8.7\times \sin 52^{o}$ or complete method to find area using trig and/or Pythagoras and ½ base × height A1 39.75 – 39.8
	(b)	XZ^2 $= 8.7^2 + 11.6^2 – 2 \times 8.7 \times 11.6 \times \cos 52°$ $= 85.985$	9.27	3	M1 $8.7^2 + 11.6^2 – 2 \times 8.7 \times 11.6 \times \cos 52°$ M1 for correct order of evaluation or 85.985 A1 answer in the range 9.27 – 9.275
18.			$y=\frac{10}{3}x+\frac{130}{3}$	5	B1 for stating *B* as (0, 5) or *OB* = 5 (could be written on the diagram) B1 for *C* as (10, 0) or *OC* = 10 (could be written on the diagram) or *A* is (–10, 10) or ft from their *BC* M1 gradient of *DA* = $\frac{10}{3}$ or $y=\frac{10}{3}x+c$ M1 for substitution of $x = –13$, $y = 0$ or $x = –10$, $y = 10$ in their equation A1 $y=\frac{10}{3}x+\frac{130}{3}$ oe

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19.			1.33	3	M1 for $3.4 = \frac{k}{5^2}$ (oe) or 3.4×5^2 (= 85) M1 for '3.4×5^2' $\div 8^2$ A1 for answer in range 1.32 to 1.33 or $\frac{85}{64}$
20.		$4(2x - 1) + 3(x + 3)$ $= (x + 3)(2x - 1)$ $8x - 4 + 3x + 9$ $= 2x^2 - x + 6x - 3$ $2x^2 - 6x - 8 = 0$ $2(x - 4)(x + 1) = 0$	$x = -1, 4$	5	M1 multiplying both sides by a common denominator of $(x + 3)(2x - 1)$ (oe) or $\frac{4(2x-1)+3(x+3)}{(x+3)(2x-1)}$ (= 1) or better seen or multiplying all 3 terms by $(x + 3)$ or by $(2x - 1)$ M1 (indep) for $2x^2 - x + 6x - 3$ oe seen or $8x - 4 + 3x + 9$ (oe) A1 for $2x^2 - 6x - 8$ (oe) or $x^2 - 3x - 4$ (= 0) M1 (dep on M2) for correct method to solve a 3 term quadratic A1 cao for both solutions

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21.		e.g. $1 \times 7.6 + 3 \times 9.4 + 2 \times 5.6 + 6 \times 1.4 = 55.4$ $55.4 \div 2 = 27.7$ $27.7 - 7.6$ $= 20.1$ $20.1 \div 9.4$ $= 2.138\ldots$ Median $= 55 + 2.138\ldots \times 2.5$ $= 60.345\ldots$	60.3	4	M1 for attempt to find the area of one bar M1 for attempt to find total area ÷ 2 (condone one error) M1 for correct attempt to locate median in second bar (condone one arithmetic error) A1 for 60.3(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	4MA0	2H	1405	Q11	Graphs of functions	4	3.67	3.94	3.84	3.64	3.07	1.89	0.73
2	2MB01	1H	1411	Q06	Fuel costs	4	2.66	4.00	3.42	3.48	2.47	1.33	0.80
3	5AM2	2H	1211	Q05	Solve inequalities	4	3.17	3.95	3.69	3.30	2.96	2.59	1.00
4	5AM1	1H	1211	Q10	Reverse percentages	3	1.62	3.00	2.70	1.89	0.76	0.60	0.00
5	1MA0	2H	1406	Q22	Probability	3	1.31	2.81	2.41	1.62	0.80	0.39	0.12
6	4MA0(R)	2F	1501	Q24	Sets	5	2.09	5.00	4.00	3.00	2.67	1.31	1.00
7	5MM2	2H	1311	Q18	Solve inequalities	2	1.20	1.88	1.58	1.39	0.98	0.41	0.17
8	5AM2	2F	1106	Q19	Probability	3	0.39	3.00	2.00	1.00	0.34	0.72	0.50
9	2MB01	3H	1311	Q13	Similar triangles	4	1.15	2.97	1.97	1.04	0.47	0.08	0.02
10	5AM1	1H	1211	Q13	Simultaneous equations	5	3.58	4.88	4.70	4.15	2.92	0.67	0.00
11	5AM1	1H	1411	Q24	Compound interest	2	0.33	1.67	0.88	0.25	0.14	0.00	0.00
12	5AM2	2H	1311	Q21	Selection with or without replacement	3	1.32	2.74	2.06	1.47	0.59	0.22	0.00
13	5AM1	1H	1311	Q15	Solve linear equations	4	1.30	3.32	2.22	1.27	0.46	0.06	0.00
14	5AM2	2H	1406	Q18	Bounds	5	1.57	3.53	2.65	1.45	0.44	0.10	0.00
15	5AM2	2H	1311	Q23	Areas under curves	4	0.93	3.19	1.92	0.55	0.31	0.26	0.00
16	NEW				Iteration	3							
17	5MM2	2H	1206	Q23	Sine and cosine rule	5	2.37	4.68	3.91	2.11	0.67	0.10	0.06
18	2MB01	2H	1411	Q12	Perpendicular lines	5	0.09	0.50	0.33	0.05	0.03	0.00	0.00
19	1MA0	2H	1306	Q22	Direct and inverse proportion	3	0.34	2.30	1.03	0.20	0.02	0.00	0.00
20	1380	2H	911	Q29	Solve algebraic fraction equations	5	0.48	3.45	1.01	0.19	0.03	0.00	0.00
21	5AM1	1H	1311	Q21	Histograms and grouped data	4	0.42	2.04	0.67	0.23	0.12	0.00	0.00
						80							