1MA1 Practice papers Set 3: Paper 1H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.	(*a*)		4	1	B1 cao
	(*b*)		7 or (0,7)	1	B1 cao
2.		$\frac{25}{8}-\frac{5}{3}=\frac{75-40}{24}=\frac{35}{24}$ **OR** $2\frac{1}{8}-\frac{2}{3}=2\frac{3-16}{24}$ $=1\frac{27-1}{24}$ **OR** $2\frac{1}{8}-\frac{2}{3}=2\frac{3-16}{24}$ $=2\frac{-13}{24}$	$1\frac{11}{24}$	3	M1 for converting to improper fractions, at least one correct or 3 – 1 = 2 and 'borrowing' or negative fraction answer M1 for putting fractions over a common denominator, at least one correct A1 for $\frac{35}{24}$ or $1\frac{11}{24}$

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Question		**Working**	**Answer**	**Mark**	**Notes**
3.			20	3	M1 for 330 ÷ 120 (= 2.75) or 200 ÷ 60 (= 3 $^1/_3$) or 450 ÷ 180 (= 2.5) M1 for 450 ÷ 180 (= 2.5) AND 8 ×"2.5"(= 20) A1 cao **OR** M1 for 120 ÷ 8 (= 15) or 60 ÷ 8 (= 7.5) or 180 ÷ 8 (= 22.5) M1 for 330 ÷ (120 ÷ 8) (= 22) or 200 ÷ (60 ÷ 8) (= 26.6...) or 450 ÷ (180 ÷ 8) (= 20) A1 cao **OR** M1 for multiples of 120:60:180, e.g. 240:120:360 M1 for multiples linked to 450 and 8+8+4 or scaling 2.5 oe A1 cao
4.		2.25 × 60 ÷ 100 = 1.35 1.35 + 0.80 = 2.15 1.5 × 60 ÷ 100 = 0.90 0.90 + 1.90 = 2.80	Railtickets with correct calculations	4	NB. All work may be done in pence throughout M1 for correct method to find credit card charge for one company e.g. 0.0225 × 60(= 1.35) oe or 0.015 × 60 (= 0.9) oe M1 (dep) for correct method to find total additional charge or total price for one company e.g. 0.0225 × 60 + 0.80 or 0.015 × 60 + 1.90 or 2.15 or 2.8(0) or 62.15 or 62.8(0) A1 for 2.15 and 2.8(0) or 62.15 and 62.8(0) C1 (dep on M1) for a statement deducing the cheapest company, but figures used for the comparison must also be stated somewhere, and a clear association with the name of each company

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		OR 2.25 – 1.5 = 0.75 0.075 × 60 ÷ 100 = 0.45 0.80 + 0.45 = 1.25 1.25 < 1.90			**OR** M1 for correct method to find percentage of (60 + booking fee) e.g. 0.0225 × 60.8 (= 1.368) oe or 0.015 × 61.9 (= 0.9285) M1 (dep) for correct method to find total cost or total additional cost e.g. '1.368' + 60.8 (= 62.168) or '1.368' + 0.8 (= 2.168) or '0.9285' + 61.9 (= 62.8285) or '0.9285' +1.9 (= 2.8285) A1 for 62.168 or 62.17 AND 62.8285 or 62.83 OR 2.168 or 2.17 AND 2.8285 or 2.83 C1 (dep on M1) for a statement deducing the cheapest company, but figures used for the comparison must also be stated somewhere, and a clear association with the name of each company **OR** M1 for correct method to find difference in cost of credit card charge e.g. (2.25 – 1.5) × 60 ÷ 100 oe or 0.45 seen M1 (dep) for using difference with booking fee or finding difference between booking fees e.g. 0.80 + "0.45"(= 1.25) or 1.90 – "0.45" (= 1.45) or 1.90 – 0.8 (= 1.1(0)) A1 1.25 and 1.9(0) or 0.45 and 1.1(0) C1 (dep on M1) for a statement deducing the cheapest company, but figures used for the comparison must also be stated somewhere, and a clear association with the name of each company QWC: Decision and justification should be clear with working clearly presented and attributable

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Question		**Working**	**Answer**	**Mark**	**Notes**
5.	(*a*)		Correct frequency polygon	2	B2 for fully correct polygon. Points plotted at the midpoints ± ½ square (B1 for all points plotted accurately not joined or one error or one omission in plotting but joined) or all points plotted accurately and joined with first joined to last or all points at the correct heights and consistently within or at the ends of the intervals and joined (can include joining last to first to make a polygon)
	(*b*)	20 + 12 + 10 + 8 + 6	56	2	M1 for 20 + 12 + 10 + 8 + 6 A1 cao
	(*c*)		$0 \leq L < 10$	1	B1 for $0 \leq L < 10$ oe

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Question		**Working**	**Answer**	**Mark**	**Notes**
6.		Area of circle B is 110% of the area of circle A Area of circle C is 110% of 110% = 121% of the area of circle A. **OR** Area of circle B is 220 cm^2 Area of circle C is 242 cm^2 Area of circle B is 1.1 times bigger Area of circle C is $1.1 \times 1.1 = 1.21$ times bigger	21% or 42 cm^2	4	B1 110% seen M1 $\frac{110}{100} \times 110$ oe A1 121% C1 dep on M1 for 21% bigger oe **OR** B1 220 shown M1 $\frac{110}{100} \times 220$ A1 242 C1 dep on M1 for area is 42 cm^2bigger oe **OR** B1 for 1.1 seen M1 for 1.1×1.1 A1 for 1.21 C1 dep on M1 for 21% larger or 1.21 times larger o.e.
7.	(*a*)	$2x + 6y + 4x – 4y$	$6x + 2y$	2	M1 for $2x + 6y$ or $4x – 4y$ or $6x$ or $2y$ A1 for $6x + 2y$ [accept $2(3x + y)$]
	(*b*)	$2 \times 4 \times p – 3 \times 4 \times p \times q$	$4p(2 – 3q)$	2	B2 cao [B1 for $2p(4 – 6q)$ or $p(8 – 12q)$ or $4(2p – 3pq)$ or $2(4p – 6pq)$ or $4p(a + bq)$ where $a \neq 0$ and $b \neq 0$]

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Question		**Working**	**Answer**	**Mark**	**Notes**
8.			"two angles are equal so the triangle is isosceles"	5	M1 for $6x - 10 + 4x + 8 + 5x + 2$ or $15x$ M1 for $6x - 10 + 4x + 8 + 5x + 2 = 180$ or $15x = 180$ or $(x =)\ 180 \div 15$ A1 $x = 12$ M1 (ft from '12' if M2 scored) for $5 \times$ '12' + 2 or $6 \times$ '12' − 10 or 62(°) or $4 \times$ '12' + 8 or 56(°) C1 both base angles as 62 and two angles are equal so the triangle is isosceles NB. $x = 12$ with no working scores M0M0A0 ; correct value of x from clear trial and improvement could gain M1M1A1 **OR** M1 $5x + 2 = 6x – 10$ or $2 + 10 = 6x – 5x$ A1 $x = 12$ M1 $5 \times 12 + 2$ or $6 \times 12 - 10$ or 62(°) or $4 \times 12 + 8$ or 56(°) M1 checking their angles add to 180°, "62"+"62"+"56"= 180 C1 both base angles as 62 and two angles are equal so the triangle is isosceles **OR** M1 $4x + 8 = 5x + 2$ oe or $4x + 8 = 6x – 10$ A1 $x = 6$ or $x = 9$ M1 (dep) for substituting 'x' into one of the angles oe M1 for showing their angles do not sum to 180° C0

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Question		**Working**	**Answer**	**Mark**	**Notes**
9.	(*a*)	30 = 2 × 3 × 5 42 = 2 × 3 × 7 HCF = 2 × 3	6	2	M1 for 30 or 42 written correctly as a product of prime factors or attempt to list the factors of 30 and 42 (at least 4 for each including 6) A1 for HCF = 6
	(*b*)	30 , 60, 90, ... 45, 90, 135, ...	90	2	M1 for listing multiples of 30 and 45 (at least 60 and 90) or 2 × 3 × 5 × 3 A1 for LCM = 90 SC B1 for 210
10.		½ (12 + 8) × 6 = 60 '60' × 20 = 1200 1200 × 5 = 6000 6000 ÷ 1000 = 6	6	5	M1 ½ (12 + 8) × 6 oe or 60 seen M1 (dep) '60' × 20 M1 (indep) '1200' × 5 A1 6000 cao A1 ft (dep on 1^{st} or 3^{rd} M1 scored) for 6

1MA1 Practice papers Set 3: Paper 1H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
11.	(*a*)		1	1	B1 cao
	(*b*)		$\frac{1}{7}$	1	B1 for $\frac{1}{7}$ (condone $\pm\frac{1}{7}$)
	(*c*)	$\frac{2^3 \div 2^3}{2^{4^3}} = \frac{2^5}{2^{12}}$ **OR** $\frac{2\times16}{16\times16\times16} =$ $\frac{2}{16\times16} = \frac{2}{2^4\times2^4} = \frac{2}{2^8}$	2^{-7}	3	M1 for writing one of the numbers correctly as a power of 2 M1 for $2^{'2'}\times2^{'3'} = 2^{'2'+'3'}\left(=2^5\right)$ or $\left(2^{'4'}\right)^3 = 2^{'4'\times3}\left(=2^{12}\right)$ or $\frac{2^{'5'}}{2^{'12'}} = 2^{'5'-'12'}$ A1 for 2^{-7} or $\frac{1}{2^{-7}}$ **OR** B1 for $\frac{1}{16^2}$ or an equivalent fraction with a numerator of 2 M1 for $2^{'4'}\times2^{'4'} = 2^{'4'+'4'}\left(=2^8\right)$ or $\frac{2^{'1'}}{2^{'8'}} = 2^{'1'-'8'}$ A1 for 2^{-7} or $\frac{1}{2^7}$ [SC: B1 for an answer of $\frac{1}{128}$ if M0 scored]

1MA1 Practice papers Set 3: Paper 1H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
12.		**yy + yy′ + y′y** $\frac{3}{9}\times\frac{2}{8}+\frac{3}{9}\times\frac{6}{8}+\frac{6}{9}\times\frac{3}{8}$ **OR** **yy + yr + yb + ry + by** $\frac{3}{9}\times\frac{2}{8}+\frac{3}{9}\times\frac{4}{8}+\frac{3}{9}\times\frac{2}{8}+$ $\frac{4}{9}\times\frac{3}{8}+\frac{2}{9}\times\frac{3}{8}$ **OR** **1 - y′ y′** $1-\frac{6}{9}\times\frac{5}{8}$	$\frac{42}{72}$	4	B1 for $\frac{2}{8}$ **or** $\frac{3}{8}$ **or** $\frac{4}{8}$ **or** $\frac{6}{8}$ **or** $\frac{5}{8}$ seen as 2nd probability M1 for any one appropriate product (see working column) M1 for a complete method A1 for $\frac{42}{72}$ oe, eg $\frac{7}{12}$ **With replacement** B0 M1 for any one appropriate product M1 for a complete method A0
13.		$\frac{(2x-1)(x-3)}{(x+3)(x-3)}$	$\frac{(2x-1)}{(x+3)}$	3	M1 for $(2x – 1)(x – 3)$ M1 for $(x + 3)(x – 3)$ A1 cao
14.		$(2 + \sqrt{3})(2 – \sqrt{3})$ $= 4 – 2\sqrt{3} + 2\sqrt{3} – \sqrt{3}\sqrt{3}$ $= 4 – 3$	1	2	M1 for all 4 terms correct ignoring signs or 3 out of 4 terms with correct signs or correct use of difference of 2 squares A1 cao (SC M1 for $4 – 2\sqrt{3} + 2\sqrt{3}$)

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Question		**Working**	**Answer**	**Mark**	**Notes**
15.			Proof	3	M1 for $\overrightarrow{MN} = \overrightarrow{MO} + \overrightarrow{ON}$ (= **n** – **m**) or $\overrightarrow{NM} = \overrightarrow{OM} + \overrightarrow{NO}$ (= **m** – **n**) or $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$ (= 2**n** – 2**m**) or $\overrightarrow{BA} = \overrightarrow{OA} + \overrightarrow{BO}$ (= 2**m** – 2**n**) M1 for $\overrightarrow{MN}$= **n** – **m** and $\overrightarrow{AB}$= 2**n** – 2**m** oe C1 (dep on M1, M1) for fully correct proof, with $\overrightarrow{AB}$= 2$\overrightarrow{MN}$ or $\overrightarrow{AB}$ is a multiple of $\overrightarrow{MN}$ [SC M1 for $\overrightarrow{MN}$= 0.5**n** – 0.5**m** and $\overrightarrow{AB}$ = **n** – **m**] C1 (dep on M1) for fully correct proof, with $\overrightarrow{AB}$= 2$\overrightarrow{MN}$ or $\overrightarrow{AB}$ is a multiple of of $\overrightarrow{MN}$]

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Question		**Working**	**Answer**	**Mark**	**Notes**
16.		$360 - y$	$180 - \frac{y}{2}$	4	M1 $ADC = \frac{y}{2}$ A1 $180 - \frac{y}{2}$ C2 (dep on M1) for both reasons Angle at centre is twice the angle at the circumference Opposite angles in cyclic quadrilateral add to 180˚ (C1 (dep on M1) for one appropriate circle theorem reason) **OR** M1 reflex $AOC = 360 - y$ A1 $\frac{360-y}{2}$ oe C2 (dep on M1) for both reasons Angles around a point add up to 360˚ Angle at centre is twice the angle at the circumference (C1 (dep on M1) for one appropriate circle theorem reason)
17.	(*a*)		(5,–4)	2	B2 for (5,–4) (B1 for (a,–4) or (5,b) where $a \neq 5$ or 3 and $b \neq -4$).
	(*b*)		(–2,2)	2	B2 for (–2,2) (B1 for (a,2) or (–2,b) where $a \neq -2$ and $b \neq 2$).

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Question		**Working**	**Answer**	**Mark**	**Notes**
18.		*ABE* = angle *CBD* (vertically opposite angles) angle *EAB* = angle *CDB* (alternate angles) angle *AEB* = angle *BCD* (alternate angles) **OR** angle *EAB* = angle *CDB* (alternate angles) angle *AEB* = angle *BCD* (alternate angles) *ABE* = angle *CBD* (angles in a triangle sum to 180˚)	proof	4	M1 for any 2 pairs of angles correctly matched A1 for all 3 pairs correctly matched C2 (dep on M1)for full reasons and concluding statement (C1(dep on M1) for at least one reason)
19.	(*a*)(i)		$\frac{\sqrt{3}}{2}$	2	B1 cao
	(ii)		$-\frac{\sqrt{3}}{2}$		B1 cao
	(*b*)			2	B2 cao [B1 for sine curve starting from the origin with amplitude 4, OR B1 cuts *x* axis at 90, 180, 270, 360 and starts from 0]

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Question		**Working**	**Answer**	**Mark**	**Notes**
20.		$(n+1)^2 - n^2$ $= n^2 + 2n + 1 - n^2$ $= 2n + 1$ $(n+1) + n = 2n + 1$ **OR** $(n+1)^2 - n^2$ $= (n + 1 + n)(n + 1 - n)$ $= (2n + 1)(1) = 2n + 1$ $(n+1) + n = 2n + 1$ **OR** $n^2 - (n+1)^2 =$ $n^2 - (n^2 + 2n + 1) =$ $-2n - 1 = -(2n + 1)$ Difference is $2n + 1$ $(n+1) + n = 2n + 1$	proof	4	M1 for any two consecutive integers expressed algebraically e.g. n and $n+1$ M1 (dep on M1) for the difference between the squares of 'two consecutive integers' expressed algebraically e.g. $(n+1)^2 - n^2$ A1 for correct expansion and simplification of difference of squares, e.g. $2n + 1$ C1 (dep on M2A1) for showing statement is correct, e.g. $n + n + 1 = 2n + 1$ and $(n+1)^2 - n^2 = 2n + 1$ from correct supporting algebra

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Question		**Working**	**Answer**	**Mark**	**Notes**
21.				4	M1 for − ((x + 1.5)^2 − (1.5)^2 − 5) or attempt to find points to plot - must have at least 3 correct points evaluated or correct method to find x axis intercepts A1 for − ((x + 1.5)^2 − 7.25) or parabola with marximum marked at (−1.5, 7.25) or $\frac{3\pm\sqrt{29}}{2}$ C1 for parabola drawn with maxiumum in 2nd quadrant or y intercept (0, 5) or with x axis intercepts at $\left(\frac{3\pm\sqrt{29}}{2},0\right)$ C1 for parabola drawn with maxiumum (-1.5, 7.25) and y intercept (0, 5) and x axis intercepts at $\left(\frac{3\pm\sqrt{29}}{2},0\right)$

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	5MM1	1H	1111	Q10	Gradients	2	66	1.32	1.88	1.87	1.44	0.83	0.36	0.00
2	5MM1	1H	1206	Q16	Fractions	3	65	1.94	2.90	2.67	2.31	1.32	0.45	0.07
3	1MA0	1F	1511	Q19	Ratio	3	39	1.17				1.55	1.25	0.95
4	1MA0	1H	1206	Q10	Percentages	4	55	2.19	3.64	3.20	2.70	1.78	0.54	0.16
5	1380	1F	1203	Q21	Frequency diagrams	5	40	2.02	5.00	4.50	4.00	3.03	2.38	1.74
6	5MM2	2H	1206	Q14	Percentages	4	85	3.41	3.89	3.72	3.57	3.15	2.12	0.44
7	5MM1	1H	1106	Q08	Simplify expressions	4	68	2.71	3.82	3.64	3.23	2.44	1.45	1.00
8	5MM1	1H	1306	Q11	Solve linear equations	5	53	2.65	4.73	4.35	3.18	1.44	0.45	0.00
9	5MM1	1H	1206	Q12	HCF and LCM	4	70	2.79	3.67	3.37	2.85	2.29	1.72	1.27
10	1380	1H	1111	Q16	Compound measures	5	18	0.91	4.14	2.74	1.30	0.36	0.09	0.05
11	5MM1	1H	1106	Q12	Index laws	5	29	1.43	4.63	2.86	1.28	0.65	0.32	0.14
12	5MM1	1H	1406	Q24	Selection with or without replacement	4	45	1.81	3.50	2.86	1.92	0.78	0.18	0.11
13	5MM1	1H	1211	Q25	Simplify algebraic fractions	3	25	0.74	2.69	1.88	0.84	0.07	0.00	0.00
14	1380	1H	911	Q21	Surds	2	24	0.47	1.83	1.23	0.46	0.09	0.02	0.01
15	1MA0	1H	1406	Q24	Vectors	3	20	0.59	2.58	1.74	0.52	0.05	0.00	0.00
16	1MA0	1H	1311	Q22	Circle theorems	4	16	0.65	3.19	1.98	0.65	0.09	0.01	0.00
17	1380	1H	911	Q24	Transformation of functions	4	21	0.83	3.56	1.87	0.64	0.24	0.15	0.13
18	5MM1	1H	1311	Q21	Congruence and similarity	4	20	0.80	2.52	1.38	0.82	0.34	0.09	0.00
19	2540	1H	811	Q27	Graphs of trigonometric functions	4	13	0.52	2.69	1.31	0.52	0.18	0.08	0.07
20	1MA0	1H	1303	Q21	Algebraic proof	4	3	0.11	2.09	0.38	0.03	0.00	0.00	0.00
21	NEW QUESTION				Turning point of quadratic function	4	No data available							
						80								