1MA1 Practice papers Set 5: Paper 1H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
1.	(a)	$12 = 2 \times 2 \times 3$ $20 = 2 \times 2 \times 5$ OR 12: 1, 2, 3, 4, 6, 12 20: 1, 2, 4, 5, 10, 20	4	2	M1 for dealing with both 12 **and** 20 by, Writing each number as a product of prime factors (condone one error only); or by, Listing the factors of each number (condone one error only), or by, Drawing a Venn Diagram (or two factor trees) showing all prime factors of each number (condone one error only) A1 for HCF = 4 (accept 2×2 or 2^2)
	(b)	$32 = 2 \times 2 \times 2 \times 2 \times 2$ $48 = 2 \times 2 \times 2 \times 2 \times 3$ OR 32. 64, 96, 128, … 48, 96, 144, ….	96	2	M1 for dealing with both 32 **and** 48 by, Writing each number as a product of prime factors (condone one error only); or by, Listing the multiples of each number , up to at least 96 in each list (condone one error only), or by, Drawing a Venn Diagram (or two factor trees) showing all prime factors of each number (condone one error only) A1 for LCM = 96 (accept $2^5 \times 3$ or $2\times2\times2\times2\times2\times3$) [SC: B1 for any multiple of both 32 and 48 (eg 192) if M0 scored]

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2.			240	4	M1 for 16 × 2 (= 32 girls) M1 for 16 + '16 × 2' (= 48) M1 (dep on the previous M1) for (16 + '32') × 5 **or** (16 + '32') × (4 + 1) A1 cao **OR** M1 for 1 : 2 = 3 parts M1 for 5 schools × 3 parts (= 15 parts) M1 (dep on the previous M1) for '15' parts × 16 A1 cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
3.	(a)	$(6 \times 10^8) \times (4 \times 10^7) = 24 \times 10^{8+7}$ 24×10^{15}	2.4×10^{16}	2	M1 $24 \times 10^{8+7}$ oe or 24 000 000 000 000 000 or 2.4×10^n A1 cao
	(b)	$(6 \times 10^8) + (4 \times 10^7)$ $= 6 \times 10^8 + 0.4 \times 10^8$	6.4×10^8	2	M1 $6\times10^8 + 0.4\times10^8$ or $60\times10^7 + 4\times10^7$ or 600 000 000 + 40 000 000 or 640 000 000 oe or 6.4×10^n A1 cao
4.		150 ÷ 6 or $\frac{1}{6} \times 150$	25	2	M1 150 ÷ 6 or $\frac{1}{6} \times 150$ A1 cao NB $\frac{25}{150}$ scores M1 A0
5.			21	2	M1 for $\frac{12}{8}$ oe or $\frac{8}{12}$ oe or $\frac{14}{8}$ oe or $\frac{8}{14}$ oe A1 cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
6.	(a)	$\frac{5}{15}+\frac{6}{15}$	$\frac{11}{15}$	2	M1 for common denominator with at least one numerator correct A1 for $\frac{11}{15}$ oe (B2 for 0.73 recurring)
	(b)	$\frac{11}{4}\times\frac{8}{5}=\frac{88}{20}$	$\frac{22}{5}$	3	M1 for $\frac{11}{4}$ or $\frac{8}{5}$ M1 for $\frac{11}{4}\times\frac{8}{5}$ or $\frac{88}{20}$ oe A1 for $\frac{22}{5}$ or $4\frac{2}{5}$ or 4.4
7.	(a)	$3t + 1 < t + 12$ $3t - t < 12 - 1$ $2t < 11$	$t < 5.5$	2	M1 $3t - t < 12 - 1$ A1 $t < 5.5$ oe (B1 for $t = 5.5$ or $t > 5.5$ or 5.5 or $t \leq 5.5$ or $t \geq 5.5$ on the answer line)
	(b)		5	1	B1 for 5 or ft (a)

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Question		**Working**	**Answer**	**Mark**	**Notes**
8.			32.5	3	M1 for 45 ÷ 30 (=1.5) or 1hr 30 min seen or for 20 ÷ 40 (= 0.5 or 30min) M1 (dep) for (45 + 20) ÷ ("1.5" + "0.5") A1 cao
9.	(a)		$(x + 7)(x - 7)$	1	B1 cao
	(b)	$2y^2 - 6y + 7y - 21$	$2y^2 + y - 21$	2	M1 for 3 out of no more than 4 terms correct with correct signs or the 4 terms $2y^2$, $6y$, $7y$ and 21 seen, ignoring signs A1 cao
10.	(a)		C	1	B1 cao
	(b)		B and C	1	B1 cao
11.			$3xy(y - 2x^2)$	2	M1 for $3x \times (y^2 - 2x^2y)$ or $3y \times (xy - 2x^3)$ or $xy \times (3y - 6x^2)$ or $3xy \times$ (a 2 term expression in x and y, with just one error) A1 cao

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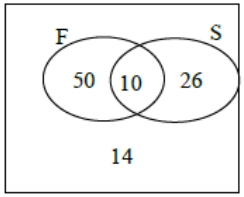
Question		**Working**	**Answer**	**Mark**	**Notes**
12.	(a)		–13, –1, 2	2	B2 for all values correct (B1 for any one value correct)
	(b)		Graph drawn	2	M1 ft for at least 4 points plotted correctly from their table A1 cao for correct curve drawn from (–2, –13) to (2, 11)
13.	(a)	100 − 14 = 86 60 + 36 − 86 = 10 60 − 10 = 50 36 − 10 = 26		4	M1 for two overlapping labelled circles B1 for 14 shown outside the circles M1 for 60-‘10’ or 36-‘10’ (‘10’≠0) A1 for a fully correct and labelled Venn diagram (condone omission of surrounding rectangle)
	(b)	$\frac{100-14}{100}$	$\frac{86}{100}$	2	M1 for ‘50’ + ‘10’ + ‘26’ or 100 − ‘14’
14.			126	4	M1 for method to find exterior or interior angle of octagon M1 for method to find exterior or interior angle of pentagon M1 for complete method A1 cao

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15.			28	4	M1 for forming a correct equation , eg $2(3x + 5) = 10x - 2$ oe $3x + 5 = \frac{1}{2}(10x - 2)$ oe or $10x - 2 - (3x + 5) = 3x + 5$ oe M1 (dep) for dealing with brackets correctly **or** correct method to isolate all x terms on one side. A1 $x = 3$ B1 ft (dep on M1) for 28 SC: B3 for an answer of 14 if no previous marks scored

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Question		**Working**	**Answer**	**Mark**	**Notes**
16.	(a)	$1-\frac{2}{9}$	$\frac{7}{9}$	1	B1 $\frac{7}{9}$ oe
	(b)	Tree diagram or	$\frac{10}{81}$	5	B1 for $\frac{5}{9}$ or $\frac{1}{9}$ seen
	(i)	$\frac{5}{9}\times\frac{1}{9}+\frac{1}{9}\times\frac{5}{9}$			M1 Indication of correct 2 branches from a tree diagram leading to $\frac{5}{9}\times\frac{1}{9}+\frac{5}{9}\times\frac{1}{9}$ seen A1 $\frac{10}{81}$ Or B1 $\frac{5}{9}$ or $\frac{1}{9}$ seen M1 $\frac{5}{9}\times\frac{1}{9}\times 2$ A1 $\frac{10}{81}$

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Question		**Working**	**Answer**	**Mark**	**Notes**
17.			1 hour 45 mins	6	M1 for method to find volume of pond, eg $\frac{1}{2}(1.3 + 0.5) \times 2 \times 1$ (= 1.8) M1 for method to find the volume of water emptied in 30 minutes, eg $1 \times 2 \times 0.2$ (= 0.4), $100 \times 200 \times 20$ (= 400000) A1 for correct rate, eg 0.8 m³/hr, 0.4 m³ in 30 minutes M1 for correct method to find total time taken to empty the pond, eg "1.8" ÷ "0.8" M1 for method to find extra time, eg 2 hrs 15 minutes − 30 minutes A1 for 1.75 hours, $1\frac{3}{4}$ hours, 1 hour 45 mins or 105 mins **OR** M1 for method to find volume of water emptied in 30 minutes,.eg. $1 \times 2 \times 0.2$ (= 0.4), $100 \times 200 \times 20$ (= 400000) M1 for method to work out rate of water loss eg. "0.4" × 2 A1 for correct rate, eg 0.8 m³/hr M1 for correct method to work out remaining volume of water

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Question		**Working**	**Answer**	**Mark**	**Notes**
					e.g. $\frac{1}{2}(1.1 + 0.3) \times 2 \times 1$ (= 1.4) M1 for method to work out time, e.g. "1.4" ÷ "0.8" A1 for 1.75 hours, $1\frac{3}{4}$ hours, 1 hour 45 mins or 105 mins
18.	(a)		$2^{-2}, \frac{1}{2}, \frac{1}{\sqrt{2}}, 2^0, \sqrt{2}$	2	M1 for changing to powers of 2, e.g. sight of $2^{0.5}$ or 2^{-1} or $2^{-0.5}$ A1 for correct order (accept alternative equivalent forms, e.g. all powers of 2) (SCB1 if M0 scored, for all in correct reverse order)
	(b)		$2\sqrt{2}$	3	M1 for cubing M1 for a correct method to rationalise A1 for $2\sqrt{2}$ (accept $a = 2$)

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Question		**Working**	**Answer**	**Mark**	**Notes**
19.	(a)		Circle, centre O, radius 2	2	B2 cao (B1 for a circle radius 2 any centre or for a circle or part of a circle centre (0, 0) any radius)
	(b)		Cosine curve crossing at (0, 1), (90, 0), (270, 0) and (360, 1)	2	B2 cao (ignore if sketch outside region) (B1 for a curve with correct intercepts but incorrect amplitude OR for a curve starting at (0,1) with correct amplitude but incorrect intercepts; curves must have a shape that approximates to a cosine curve)
20.			$\frac{3x}{x-3}$	3	M1 for factorising numerator, e.g. $(x + 3)(2x – 5)$ M1 for factorising denominator, e.g. $2x^2(x + 3)$ and $(2x – 5)(x – 3)$ C1 fully correct working leading to $\frac{3x}{x-3}$

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Question		**Working**	**Answer**	**Mark**	**Notes**
21.		$2y = 3x - 4$ $y = \frac{3}{2}x - 2$; $m = \frac{3}{2}$ $\frac{3--1}{1-4} = -\frac{4}{3}$ $\frac{3}{2} \times -\frac{4}{3} = -2$	No, with reason	4	M1 for $\frac{3}{2}$ oe or $y = \frac{3}{2}x\left(-\frac{4}{2}\right)$ oe M1 for method to find gradient of AB, e.g. $\frac{3--1}{1-4}$ **or** $\frac{-1-3}{4-1}$ **or** $-\frac{4}{3}$ oe A1 for identifying gradients as $\frac{3}{2}$ oe **and** $-\frac{4}{3}$ oe C1 (dep on M1) for a conclusion with a correct reason, e.g. No, as product of $\frac{3}{2}$ and $-\frac{4}{3}$ is not −1, ft (from their two gradients)

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	1106	Q07	HCF and LCM	4	2.90	3.78	3.48	2.90	2.25	1.47	1.00
2	1MA0	1F	1303	Q23	Ratio	4	1.60				2.94	1.81	0.87
3	1380	1H	1111	Q13	Standard form	4	1.25	3.53	2.71	1.86	0.90	0.34	0.19
4	5MM1	1H	1306	Q06	Relative frequency	2	1.34	1.96	1.76	1.43	1.07	0.78	0.35
5	5MM1	1H	1506	Q14	Congruence and similarity	2	1.46	1.97	1.89	1.67	1.00	0.32	0.12
6	5MM1	1H	1406	Q15	Fractions	5	3.57	4.88	4.69	3.97	2.70	1.31	0.63
7	1380	1H	906	Q20	Solve inequalities	3	1.51	2.87	2.40	1.51	0.64	0.18	0.06
8	5MB2	2H	1306	Q11	Speed	3	0.98	2.51	1.93	1.17	0.72	0.35	0.16
9	5MB2	2H	1511	Q08de	Expanding brackets	3	1.28	3.00	3.00	2.55	1.35	1.03	0.27
10	5MM1	1H	1211	Q12	Gradients	2	1.37	2.00	1.86	1.59	1.27	0.74	1.00
11	5MM1	1H	1211	Q19	Factorise quadratic expressions	2	0.91	2.00	1.83	1.30	0.47	0.00	0.00
12	5MB3	3H	1306	Q12	Cubic graph	4	3.38	3.82	3.66	3.46	3.17	2.63	1.76
13	5MM1	1H	1311	Q17	Venn diagrams	6	4.34	5.79	5.44	4.72	3.73	2.91	2.26
14	1MA0	1H	1511	Q14	Angles	4	0.52	3.65	3.08	1.99	0.61	0.18	0.04
15	5MM1	1H	1306	Q15	Solve linear equations	4	1.83	3.80	3.22	1.94	0.75	0.29	0.00
16	5MM1	1H	1111	Q21	Probability	6	2.35	4.37	3.87	1.76	1.05	0.50	0.50
17	1MA0	1H	1306	Q17	Volume	6	0.51	3.08	1.20	0.44	0.12	0.03	0.02
18	5MM1	1H	1311	Q20	Index laws	5	0.92	3.32	1.84	0.85	0.28	0.07	0.00
19	1MA0	1H	1211	Q27	Graph of a circle	4	0.24	2.72	1.07	0.18	0.03	0.01	0.00
20	NEW				Manipulating algebraic fractions	3							
21	1MA0	1H	1411	Q24	Gradients	4	0.10	2.16	0.90	0.16	0.01	0.00	0.00
						80							