1MA1 Practice Tests Set 1: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
1		Angle *BAC* = 76° Angle *BAP* = 180° – 90° – 54° = 36° *x* = 76° – 36° OR Angle *QCD* = 54° Angle *ACP* = 180° – 76° – 54° = 50° *x* = 180° − 90° – 50 °	40°	4	B1 for Angle *BAC* = 76° (could be just on the diagram) M1 for 76° – ("180° – 90 – 54°") A1 for *x* = 40° (explicitly stated) C1 (dep on M1) for 'the sum of the angles of a triangle is 180°' and 'alternate angles on parallel lines are equal' OR B1 for Angle *QCD* = 54° (could be just on the diagram) M1 for 180° – 90° – ("180° – 76 °– 54°") A1 for *x* = 40° (explicitly stated) C1 (dep on M1) for 'corresponding angles on parallel lines are equal' and 'sum of the angles on a straight line is 180°' and 'the sum of the angles of a triangle is 180°' or 'corresponding angles on parallel lines are equal' and 'exterior angle of a triangle is equal to the sum of the two interior opposite angles' OR M1 for angle *QCB* = 180 – 54 (=126) M1 for 180 – 90 – "126 – 76" A1 for *x* = 40° (explicitly stated) C1 (dep on M1) for 'sum of allied angles = 180°' and 'the sum of the angles of a triangle is 180

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Question		**Working**	**Answer**	**Mark**	**Notes**
2		25 50 75 100 125 150 **175** 35 70 105 140 **175**	10·96	5	M1 for attempt to find the LCM of 25 and 35 eg at least 3 correct multiples of 25 and at least 3 correct multiples of 35 or 2 factor trees with at least one correct A1 for 175 M1 for at least one of $\frac{"175"}{25}$ or "5" or $\frac{"175"}{35}$ or "7" or 5.50 or 5.46 either unassociated or associated with the correct pack. M1 for "5" × £1.10 + "7" × 78p A1 cao. OR M2 for attempt to find the number of packs of cups and plates eg sight of 5 (× 35) or 7 (× 25) A1 for 5 (× 35) and 7 (× 25) M1 for 5 × £1.10 + 7 × 78p A1 cao

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Question		**Working**	**Answer**	**Mark**	**Notes**
3	(a)		$\frac{5}{14}$	1	B1 for $\frac{5}{14}$ oe fraction
			54	3	M1 for 84 ÷ (5 + 9) (= 6) or 1 – "(a)" (=)
	(b)				M1 for 84 ÷ (5 + 9) × 9 oe or A1 cao
	(c)		e.g. 6 green	3	M1 for correct method to find twice as many green beads as red beads, e.g. 2 × 30 (= 60) or 2 × (84 – "54") or "54" + "6" (= 60) A1 for 6 (green) OR if *n* reds are added then 2*n* + 6 (greens), where *n* and 2*n* could be numbers OR 30 (red) and 60 (green) C1 (dep on M1) for showing correct relevant working and clear conclusion stating number of green beads or stating total numbers of red beads and green beads
4		$\frac{48.45}{425}\times 100$ OR $\frac{11}{100}\times 425 = 46.75$	Katie spends more	3	M1 for $\frac{48.45}{425}\times 100$ A1 for 11.4 C1 (dep on M1)for conclusion ft from comparison of two percentages OR M1 for $\frac{11}{100}\times 425$ or for 10% = 42.5(0), 1% = 4.25, 42.5(0) + 4.25 A1 for 46.75 C1 (dep on M1)for correct ft from comparison of "46.75" and 48.45

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Question		**Working**	**Answer**	**Mark**	**Notes**
5		Jan x Feb $2x$ Mar $2x + 10$ Apr $\frac{1}{2}(2x + 10)$ $x + 2x + 2x + 10 + \frac{1}{2}(2x + 10) > 123$ $6x + 15 \geq 123$	18	5	M1 for a method to express all 4 months' amounts algebraically (at least 3 correct, ft) M1for an expression for total with at least 3 correct terms added M1 for a correct inequality stated algebraically M1 for an inequality reduced to $ax > b - c$ A1 cao NB: accept inequalities written as equations SC T&I is 5 marks for 18, otherwise 0 marks

1MA1 Practice Tests Set 1: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
6		$\frac{\frac{1}{2}\times\pi\times10^2-\pi\times5^2}{2}$ = 12.5π	39.3	5	M1 for $\pi \times 5^2$ (= 78.5(39…)) or $\pi \times 10^2$ (= 314(.159…)) or 100π or 25π M1 for $\frac{1}{2}\times\pi\times10^2$ (= 157(.07…)) or 50π M1 (dep on at least one of the previous Ms) for $\frac{1}{2}\times\pi\times10^2-\pi\times5^2$ M1 (dep on previous M) for ($\frac{1}{2}\times\pi\times10^2-\pi\times5^2$) ÷ 2 or $\frac{'157.07...'-'78.53....'}{2}$ or 25π/2 A1 for answer in range 39.2 – 39.3 OR M1 for $\pi \times 5^2$ (= 78.5(39…)) or $\pi \times 10^2$ (= 314(.159…)) or 100π or 25π M1 for $\frac{1}{4}\times\pi\times10^2$ (= 78.5(398…)) or 25π M1 for $\frac{1}{2}\times\pi\times5^2$ (= 39.2(69…)) or 12.5π M1(dep on 2 previous Ms) for ’78.5’ – ’39.2’ A1 for answer in range 39.2 – 39.3

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Question		**Working**	**Answer**	**Mark**	**Notes**
7			explanation	1	C1 for "he has not expanded the brackets correctly" oe
8	(a)	5000×1.028^4	5583.96	3	M1 1 + 0.028oe or 5000 × 0.028 M1 5000×1.028^4 oe or a complete method for compound interest year on year A1 cao
	(b) (i)	12000×1.02×1.035×1.05	£13301.82	5	M1 12000 × 1.02 × 1.035 × 1.05 oe or a complete method not using a multiplier A1 cao
	(ii)	3.492753115	3.49		M1 $\frac{13301.82}{12000}$ or 1.108485 M1 $(\sqrt[3]{\frac{13301.82}{12000}}-1) \times 100$ A1 cao OR M1 1.02×1.035×1.05 or 1.108485 seen M1 $(\sqrt[3]{1.02 \times 1.035 \times 1.05}-1)$x100 A1 cao

1MA1 Practice Tests Set 1: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
9	(a)	$(3x + 2)(2x + 1) = 100$ $6x^2 + 4x + 3x + 2 = 100$	$6x^2 + 7x - 98 = 0$	2	M1 $(3x + 2)(2x + 1) = 100$ or $(2x \times 3x) + 2(2x + 1) + 3x = 100$ oe or $(2x \times 3x) + (2 \times 2x (\times 1)) + 1) + 3x + 1 + 1 = 100$ oe Other partitions are acceptable but partitioning must go on to form a correct equation. A1 Accept $6x^2 + 7x + 2 = 100$ if M1 awarded
	(b)	$(3x + 14)(2x - 7)$ (= 0) $x = 3.5$ (Area =) $6 \times$ "3.5"^{2} or $(3 \times$ "3.5"$) \times (2 \times$ "3.5"$)$	73.5	5	M2 for $(3x + 14)(2x - 7)$ (= 0) or $(x =)\dfrac{-7 \pm \sqrt{49 + 2352}}{12}$ or $(x =)\dfrac{-7 \pm \sqrt{2401}}{12}$ If not M2 then M1 for $(3x \pm 14)(2x \pm 7)$ or $(x =)\dfrac{-7 \pm \sqrt{7^2 - 4 \times 6 \times -98}}{2 \times 6}$ condone + in place of ± and 1 sign error. A1 Dependent on at least M1 Ignore negative root. M1ft Dependent on at least M1 and x > 0 A1 cao Dependent on first M1

1MA1 Practice Tests Set 1: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		3, – 6, – 5	2	B2 cao for all 3 (B1 for any 1 or 2 correct)
	(b)		Quadratic graph	2	B2 for a fully correct graph OR B1 for all 7 points ft on (a) plotted correctly ± 1 sq B1 for a smooth curve through all 7 of their plotted points depending on at least B1 in (a)
	(c)	Draw $y = -3$	0.3, 3.7	2	B1 for 0.2 – 0.4 or ft from graph ± 1 square B1 for 3.6 – 3.8 or ft from graph ± 1square (SC: If no marks earned then B1 for line $y = -3$ drawn)
11		132.88 ÷ 88100	151	3	M1 for recognising that 88% is equivalent to 132.88 M1 for 132.88 ÷ 88 ×100 oe A1 cao

1MA1 Practice Tests Set 1: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
12		$DC^2 = 5^2 + 8^2$; $DC = \sqrt{89}$ $DB^2 = 5^2 + 10^2$; $DB = \sqrt{125}$ $BC^2 = 8^2 + 10^2$; $BC = \sqrt{164}$ $\cos CDB = \dfrac{89+125-164}{2\times\sqrt{89}\times\sqrt{125}}$ $= 0.23702$	76.3	6	M1 $(DC^2 =)5^2 + 8^2$ or $DC = \sqrt{89}$ = 9.4(3) M1 $(DB^2 =)5^2 + 10^2$ or $DB = \sqrt{125}$ =11.1(8) M1 $(BC^2) = 8^2 + 10^2$ or $BC = \sqrt{164}$ = 12.8(1) M2 $\cos CDB = \dfrac{'89'+'125'-'164'}{2\times'\sqrt{89}'\times'\sqrt{125}'}$ A1 76.2–76.3 OR M1 correct sub into cosine rule on formula sheet $\sqrt{'164'}^2 = \sqrt{'89'}^2 + \sqrt{'125'}^2 - 2\times\sqrt{'89'}\times\sqrt{'125'}\times\cos x$ M1 correct rearrangement to $\cos CDB = \dfrac{'89'+'125'-'164'}{2\times'\sqrt{89}'\times'\sqrt{125}'}$ A1 76.2–76.3

1MA1 Practice Tests Set 1: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
13		$4(x + 4) = 4x + 16$ $4(3x + 4) = 12x + 16$ $4x + 16 = \frac{2}{3}(12x + 16)$ $12x + 48 = 24x + 32$ $12x = 16$	5⅓	5	M1 for a correct expression for at least one perimeter. M1 for "$4x + 16$" = $\frac{2}{3}$ "$(12x + 16)$" oe M1 for $12x + 48 = 24x + 32$ or $4x + 16 = 8x + \frac{32}{3}$ oe A1 for $\frac{4}{3}$ B1 ft for "$\frac{4}{3}$" + 4 OR M2 for $x + 4 = \frac{2}{3}(3x + 4)$ M1 for $3x + 12 = 6x + 8$ or $x + 4 = x + \frac{8}{3}$ oe A1 for $\frac{4}{3}$ B1 ft for "$\frac{4}{3}$" + 4 T&I B4 for 5.33 or better

1MA1 Practice Tests Set 1: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
14		$\frac{12}{20}\times\frac{11}{19}+\frac{5}{20}\times\frac{4}{19}+\frac{3}{20}\times\frac{2}{19}$ $1-\left(\frac{12}{20}\times\frac{11}{19}+\frac{5}{20}\times\frac{4}{19}+\frac{3}{20}\times\frac{2}{19}\right)$	$\frac{222}{380}$	4	B1 for $\frac{12}{19}$ or $\frac{5}{19}$ or $\frac{3}{19}$ (could be seen in working or on a tree diagram) M1 for $\frac{12}{20}\times\frac{5}{19}$ *or* $\frac{12}{20}\times\frac{3}{19}$ *or* $\frac{5}{20}\times\frac{12}{19}$ *or* $\frac{5}{20}\times\frac{3}{19}$ *or* $\frac{3}{20}\times\frac{12}{19}$ *or* $\frac{3}{20}\times\frac{5}{19}$ M1 for $\frac{12}{20}\times\frac{5}{19}+\frac{12}{20}\times\frac{3}{19}+\frac{5}{20}\times\frac{12}{19}+\frac{5}{20}\times\frac{3}{19}+\frac{3}{20}\times\frac{12}{19}+\frac{3}{20}\times\frac{5}{19}$ A1 for $\frac{222}{380}$ oe or 0.58(421...) **OR** B1 for $\frac{8}{19}$ or $\frac{15}{19}$ or $\frac{17}{19}$ M1 for $\frac{12}{20}\times\frac{8}{19}$ *or* $\frac{5}{20}\times\frac{15}{19}$ *or* $\frac{3}{20}\times\frac{17}{19}$ M1 for $\frac{12}{20}\times\frac{8}{19}+\frac{5}{20}\times\frac{15}{19}+\frac{3}{20}\times\frac{17}{19}$ A1 for $\frac{222}{380}$ oe or 0.58(421...) **OR** (continued overleaf…)

1MA1 Practice Tests Set 1: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
14 (cont)					B1 for $\frac{11}{19}$ or $\frac{4}{19}$ or $\frac{2}{19}$ M1 for $\frac{12}{20}\times\frac{11}{19}$ *or* $\frac{5}{20}\times\frac{4}{19}$ *or* $\frac{3}{20}\times\frac{2}{19}$ M1 for $1-\left(\frac{12}{20}\times\frac{11}{19}+\frac{5}{20}\times\frac{4}{19}+\frac{3}{20}\times\frac{2}{19}\right)$ A1 for $\frac{222}{380}$ oe or 0.58(421...) **NB** if decimals used they must be correct to at least 2 decimal places **SC : with replacement** B2 for $\frac{111}{200}$ oe **OR** e.g. B0 M1 for $\frac{12}{20}\times\frac{8}{20}$ *or* $\frac{5}{20}\times\frac{15}{20}$ *or* $\frac{3}{20}\times\frac{17}{20}$ M1 for $\frac{12}{20}\times\frac{8}{20}+\frac{5}{20}\times\frac{15}{20}+\frac{3}{20}\times\frac{17}{20}$ A0

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Question		**Working**	**Answer**	**Mark**	**Notes**
15		$\frac{1}{2} \times x^2 \times \sin 60 = 36$ $x^2 = \frac{72}{\sin 60} = 83.13..$	9.12	3	M1 $\frac{1}{2} \times x^2 \times \sin 60 (= 36)$ or $\frac{1}{2} \times ab \times \sin 60 (= 36)$ Or $\frac{1}{2} \times x \times \sqrt{x^2 - \left(\frac{x}{2}\right)^2}$ (= 36) M1 $x^2 = \frac{72}{\sin 60}$ or $ab = \frac{72}{\sin 60}$ or $x^2 = \frac{36 \times 2}{\sqrt{0.75}}$ A1 9.11 – 9.12
***16**		$(2n + 1)(2m + 1)$ $= 4nm + 2n + 2m + 1$ $= 2(2nm + n + m) + 1$	Proof	3	M1 for $2n + 1$ oe used to describe an odd number A1 for product = $4nm + 2n + 2m + 1$ where n is not the same as m C1 (dep on M1) for stating that 2 × '$(2nm + n + m)$' is even since it is a multiple of 2 so adding 1 gives an odd number

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Question		**Working**	**Answer**	**Mark**	**Notes**
17		20 + 15 + 7.5 + 3.5 + 1	46 - 48	3	M1 for splitting curve appropriately to find area M1 for complete area calculation e.g. $1 \times 20 + \frac{1}{2}(20 + 10) + \frac{1}{2}(10 + 5) + \frac{1}{2}(5 + 2) + \frac{1}{2} \times 2$ A1 for answer in range 46 – 48
	(b)		overestimate with reason	1	C1 for overestimate and appropriate reason linked to method, e.g. area between trapeziums and curve is also included
18		$15 \div 70 = 120 \div n$ $120 \times 4.66(\ldots)$ OR $\frac{120 \times 70}{15}$ OR 8×70 OR $\frac{15}{70} \times 8/8 = \frac{120}{n}$ OR $120 \div 21.4 \times 100$	560	4	M2 $\frac{120 \times 70}{15}$ or $120 \times 4.66\ldots$ or 8×70 or $\frac{15}{70} \times 8/8 = \frac{120}{n}$ oe or $120 \div 21.4 \times 100$ (M1 for $\frac{15}{70}$ oe or 21.4% seen or $120 \div 15$ (= 8) or $\frac{15}{120}$ $(= \frac{1}{8})$ or 4.66(…) seen) A1 560 cao C1 for a correct mathematical assumption eg population hasn't changed overnight or sample is random, etc.

National performance data from Results Plus

	Source of questions								Mean score of students achieving grade:					
Qu	Spec	Paper	Session	Qu	Topic	Max score	Mean % all	ALL	A*	A	B	C	D	E
1	5MM2	2F	1306	Q23	Angles	4	15	0.60				1.87	0.65	0.23
2	5AM1	1H	1111	Q16	Money calculations	5	76	3.80	5.00	4.43	4.23	3.18	2.57	1.00
3	5MM2	2H	1311	Q12	Probability	7	74	5.21	6.57	6.35	5.85	4.96	2.53	0.95
4	5AM1	1H	1111	Q07	Percentages	3	67	2.02	3.00	3.00	2.20	1.27	0.43	0.00
5	5AM2	2H	1411	Q12	Solve inequalities	5	66	3.30	5.00	4.50	4.25	2.71	1.79	0.00
6	5MM2	2H	1111	Q12	Area of a circle	5	61	3.06	4.88	4.64	3.96	2.07	0.60	0.33
7				NEW	Solving linear equations	1					No data available			
8a	5AM1	1H	1206	Q16a	Compound interest	3	71	2.13	2.96	2.82	2.35	1.36	0.59	0.00
8b	5AM1	1H	1206	Q16bi	Compound interest	2					No data available			
9	4MA0	2H	1401	Q18	Solve quadratic equations	7	49	3.46	6.31	4.20	2.00	0.45	0.14	0.00
10	2540	2F	811	Q28	Graphs of quadratic equations	6	20	1.18				2.47	1.16	0.41
11	1380	2H	911	Q21	Reverse percentages	3	29	0.88	2.79	1.99	1.00	0.29	0.07	0.02
12	1387	6H	711	Q25	Pythagoras in 3D	6	28	1.65	4.35	2.12	0.79	0.16		
13	5AM1	1H	1111	Q14	Solve linear equations	5	25	1.25	4.83	1.43	0.70	0.36	0.57	1.00
14	1MA0	2H	1206	Q25	Ratio	4	24	0.96	3.52	2.34	0.86	0.16	0.02	0.00
15	1387	6H	711	Q21	Trigonometry	3	22	0.65	2.15	0.75	0.16	0.03		
16	5MM2	2H	1306	Q23	Algebraic proof	3	15	0.44	1.67	0.64	0.23	0.04	0.01	0.00
17	5AM2	2H	1506	Q20	Area under a graph	4	41	1.23	2.60	1.97	1.03	0.34	0.11	0.00
18	2MB01	1H	1111	Q14	Estimating populations	4	15	0.58			No other data available			
						80								