1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
1			$\frac{39}{80}$	4	M1 for a correct method to find $\frac{2}{5}$ of 40; eg. $40 \div 5 \times 2$ (= 16) **or** for a correct method to find $\frac{5}{8}$ of 40; eg. $40 \div 8 \times 5$ (= 25) M1 for a correct method to find $\frac{2}{5}$ of 40 **and** $\frac{5}{8}$ of 40 M1 (dep on M1) for 80 – "16" – "25" (= 39) or $\frac{\text{"16"} + \text{"25"}}{80}$ $(= \frac{41}{80})$ A1 $\frac{39}{80}$ oe **OR** M1 for $1 - \frac{2}{5}$ $(= \frac{3}{5})$ **and** $1 - \frac{5}{8}$ $(= \frac{3}{8})$ M1 for a correct method to find $\frac{3}{5}$ of 40; eg. $40 \div 5 \times 3$ (= 24) **or** for a correct method to find $\frac{3}{8}$ of 40; eg. $40 \div 8 \times 3$ (= 15) M1 (dep on M1) for "24" + "15" (= 39) A1 $\frac{39}{80}$ oe
2			$w = 2P + 3$	2	M1 for a clear intention to multiply **both** sides by 2 or add $\frac{3}{2}$ to both sides as a first step A1 for $w = 2P + 3$ oe

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Question		**Working**	**Answer**	**Mark**	**Notes**
3		25 ÷ 50 = 0.5 h = 30 min 25 ÷ 60 = 0.416h = 25 min	5	3	M1 for 25 ÷ 50 **or** $\frac{60}{50}\times 25$ **or** 30 (min) **or** 0.5(h) **or** 25 ÷ 60 **or** $\frac{60}{60}\times 25$ **or** 25 (min) **or** 0.41(6)(h) M1(dep) '0.5' –'0.41(6)'**or** '30' – '25' A1 cao **OR** M1 for 60 ÷ 25 (= 2.4) and 60 ÷ "2.4" **or** 50 ÷ 25 (= 2) and 60 ÷ "2" M1(dep) for '30' – '25' A1 cao

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
4		$12x + 9y = -21$ $12x - 16y = 104$ $25y = -125$ $y = -5$ $4x + 3 \times -5 = -7$ **OR** $16x + 12y = -28$ $9x - 12y = 78$ $25x = 50$ $x = 2$ $4 \times 2 + 3y = -7$	$x = 2$ $y = -5$	4	M1 for correct process to eliminate either x or y (condone one arithmetic error) A1 for either $x = 2$ or $y = -5$ M1 (dep on 1st M1) for correct substitution of their found value or (indep) for correct process to eliminate the other variable (condone one arithmetic error) A1 cao for both $x = 2$ and $y = -5$ **SC**: B1 for $x = 2$ or $y = -5$ if M0 scored

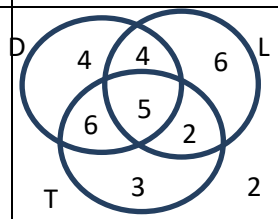
1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
5	(a)	4500×1.04^2	4867.20	3	M1 for 4500 × 1.04 or for 4500 + 0.04 × 4500 or for 4680 or 180 or 360 or 4860 M1 (dep) '4680' × 1.04 or for '4680' + 0.04 × '4680' A1 for 4867.2(0) cao (If correct answer seen then ignore any extra years) **Alternative method** M2 for 4500×1.04^2 or 4500×1.04^3 A1 for 4867.2(0) cao [SC: 367.2(0) seen B2]
	(b)	2400×1.075^n 2580 2773.5 2981.5125 3205.12… 3445.51…	5	2	M1 for an attempt to evaluate 2400×1.075^n for at least one value of n (not equal to 1) or $3445.51 \div 1.075^n$ ($n \geq 2$) or $\frac{3445.51}{2400}$(=1.4356...) and 1.075^n evaluated, $n \geq 2$ A1 for 5 cao

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
6		(AC=) $\sqrt{(8^2 - 5^2)}$ = 6.244(9…) (BPC=) 0.5×π×8 = 12.56(6…) 5 + 6.244(9…) + 12.56(6…)	23.8	5	M1 for $8^2 - 5^2$ or $AC^2 + 5^2 = 8^2$ M1 for $\sqrt{(8^2 - 5^2)}$ (=6.24(4..)) with least one of 8^2 or 5^2 correctly evaluated. M1 for 8π (=25.13 to 25.13(2…)) or 8π/2 or 4π (=12.56(6…)) using π=3.14 or better M1 for 5 + their AC + their arc PBC A1 for 23.7 – 23.9

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
7	(i)	$\frac{1}{2}\times(x+6+3x-4)\times(x-1)$ **or** $(x+6)(x-1)$ **or** $(x-1)(3x-4)$ **or** $\frac{1}{2}\times(x-1)(3x-4-(x+6))$		3	M1 correct algebraic expression for any relevant area
		$\frac{1}{2}\times(4x^2-2x-2)=119$			M1 for correct equation with at least one pair of brackets expanded correctly
			shown		A1 for completion to given equation
	(ii)	$(2x\pm15)(x\pm8)$ (= 0) **or** $\frac{--1\pm\sqrt{(-1)^2-4\times2\times-120}}{2\times2}$ **or**		3	M1 Start to solve quadratic condone one sign error in substitution if quadratic formula used; allow -1^2 or 1^2 or 1 in place of $(-1)^2$
		$\left(x-\frac{1}{4}\right)^2-\left(\frac{1}{4}\right)^2-60=0$			M1 ft from an incorrect 3 term quadratic equation
		$(2x+15)(x-8)$ (=0) **or** $\frac{1\pm\sqrt{1+960}}{4}$ **or** $x=\frac{1}{4}\pm\sqrt{\left(\frac{1}{4}\right)^2+60}$ **or** −7.5 **and** 8 given as solutions	8		A1 dep ft method from an incorrect 3 term quadratic equation Award all 3 marks if first M1 awarded **and** 8 alone given as final answer

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
8	(a)		$x \geq -1$	1	B1 cao
	(b)		$-4,-3,-2$	2	B2 for all 3 values and no extras (ignore repeats) (B1 for 2 correct values and no extras or all 3 correct values and -5)
	(c)		$y < 4$	2	M1 for clear intention to add 2 onto each side of an inequality (or equation) or clear intention to divide all terms by 5 as a first step or ($y =$) 4 A1 cao

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
9		eg. $\frac{3}{9}\times\frac{2}{8}\times\frac{1}{7}\left(=\frac{6}{504}=\frac{1}{84}\right)$		5	M1 (probabilities from selecting 2, 2, 2) allow $\frac{3}{9}\times\frac{2}{9}\times\frac{1}{9}\left(=\frac{6}{729}\right)$ **or** $\frac{3}{9}\times\frac{3}{9}\times\frac{3}{9}\left(=\frac{27}{729}\right)$
		eg. $\frac{2}{9}\times\frac{3}{8}\times\frac{4}{7}\left(=\frac{24}{504}=\frac{1}{21}\right)$			M1 (probabilities from selecting 1, 2, 3) allow $\frac{2}{9}\times\frac{3}{9}\times\frac{4}{9}\left(=\frac{24}{729}\right)$
		$6\times"\frac{24}{504}"\left(=\frac{144}{504}=\frac{6}{21}=\frac{2}{7}\right)$			M1 (probabilities for all combinations of 1, 2, 3) allow $6\times"\frac{24}{729}"\left(=\frac{144}{729}\right)$
		$6\times\frac{2}{9}\times\frac{3}{8}\times\frac{4}{7}\ +\ \frac{3}{9}\times\frac{2}{8}\times\frac{1}{7}\ \left(=\frac{6}{21}+\frac{1}{84}\right)$			M1 complete correct method
			$\frac{150}{504}$		A1 oe eg. $\frac{25}{84}$, 0.298, 0.297619…

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
10		20 = 2, 2, 5 140 = 2, 2, 5, 7 420 = 2, 2, 3, 5, 7	60	2	M1 for identifying the prime factors for 2 of the 3 numbers 20,140,420 (can be implied by a factor tree, repeated division or Venn diagram) or For a complete Venn diagram for x and 140 with 20 in the intersection or $x = 20 \times 3$ or $20 \times 7 \times y = 420$ or $\frac{420}{20 \times 7}$ or At least the 1st 3 multiples of 20 or $140x = 420 \times 20$ oe A1 (Allow 2×2×3×5)
11			380	3	M1 for $1 - 0.15$ (= 0.85) or $100 - 15$ (= 85) M1 for $323 \div 0.85$ oe or $323 \div 85 \times 100$ oe A1 cao
12			 5/9		M1 for 5 in the middle and 1 from 4(D ∩ L ∩ T′) or 2(L ∩ T ∩ D') or 6(D ∩ T ∩ L') M1 for any 4 correct entries A1 for all correct including 2 outside the circles inside the rectangle B1 ft from incorrect diagram

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
13	(a)		1	1	B1
		$y = (x - 6) / 2$			
	(b)	$2y = x - 6$			M1 or for a correct flowchart including inverse
		$2y + 6 = x$	$2x + 6$	2	A1
	(c)	$\sqrt{\frac{x-6}{2} - 4}$	$\sqrt{\frac{x-14}{2}}$	2	M1
					A1 accept $\sqrt{\frac{x}{2} - 7}$ condone ±

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
14		$PQ(ML) = 20\sin 30^o$ (=10) or $MR = \sqrt{12^2 + 20^2} = \sqrt{544}$ $= 4\sqrt{34}$ =23.32..) $LR = \sqrt{12^2 + (RQ)^2}$ = $\sqrt{12^2 + (10\sqrt{3})^2} = \sqrt{444} = 2\sqrt{11}$ $\sin MRL = \frac{10}{4\sqrt{34}}$ $\left(\frac{ML}{MR}\right)$ or $\cos MRL = \frac{2\sqrt{111}}{4\sqrt{34}}$ $\left(\frac{LR}{MR}\right)$ or $\tan MRL = \frac{10}{2\sqrt{111}}$ $\left(\frac{ML}{LR}\right)$	25.4	5	B1 Recognition of angle *LRM* as required angle either drawn on diagram or from working M2 for a correct method to calculate *PQ*(*ML*) & *MR* or *MR* & *LR* or *PQ*(*ML*) & *LR* (NB: *LR* requires use of *RQ* = $\sqrt{20^2 - 10^2}$ *or* $20\cos 30 = \sqrt{300} = 10\sqrt{3} = 17.32..$) Or M1 for a correct method to calculate one of the sides *PQ* or *MR* or *LR* M1 (Dep on M2) Use of a correct trig ratio to find angle *MRL* A1 25.38 – 25.5

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
15			21 or 22	5	M1 for $160r^2 = 90$ or $\frac{90}{160}$ M1 for (r=) $\sqrt{\frac{90}{160}}$ oe M1 (dep M2) for $160 \times \left(\sqrt{\frac{90}{160}}\right)^7$ oe A1 for 21.3… A1 for 21 or 22 **or** M1 for $160 \times r^2 = 90$ or $\frac{90}{160}$ M1 for $160 \times \frac{100-n}{100} \times \frac{100-n}{100} = 90$ M1 (dep M2) for 160×0.75^7 A1 for 21.3… A1 for 21 or 22
16		$AC^2 = 11.8^2 + 7.4^2$	105	6	M1 for $AC^2 = 11.8^2 + 7.4^2 - 2 \times 11.8 \times 7.4 \times \cos 132$

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
		$-2 \times 11.8 \times 7.4 \times \cos 132$ $AC = 17.63\ldots$ $\frac{1}{2} \times 8.2 \times$ "17.63… (= 72.28..) $+ \frac{1}{2} \times 11.8 \times 7.4 \times \sin 132$ (= 32.445..)			M1 for correct order of operations or 310.85… A1 for $AC = 17.63\ldots$ M1 for Area of $ABC = \frac{1}{2} \times 8.2 \times$ "17.63…" **or** Area of $ADC = \frac{1}{2} \times 11.8 \times 7.4 \times \sin 132$ M1 for "$\frac{1}{2} \times 8.2 \times$ "17.63…"" + "$\frac{1}{2} \times 11.8 \times 7.4 \times \sin 132$" A1 for an answer in the range 104.7 – 105

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
17		$\sqrt{t} = \frac{x}{2a}$ or $x^2 = (2a\sqrt{t})^2$ or $x^4 = (2a\sqrt{t})^4$ oe		4	M1 Correct rearrangement for $\sqrt{t}$ or correct expression for x^2 or x^4
		$t = \left(\frac{x}{2a}\right)^2$ oe or $t^2 = \frac{x^4}{16a^4}$ oe			M1 Correct expressions for t or t^2 or for at^2 or $2at$ in terms of x and a
		$y = a\left[\left(\frac{x}{2a}\right)^2\right]^2 - 2a\left(\frac{x}{2a}\right)^2$ oe			M1 for correct substitution of t and t^2 into expression for y
			$y = \frac{x^4}{16a^3} - \frac{x^2}{2a}$		A1 Fully correct answer in required form

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
18		Area ($1 < l < 6$) $= (0.12 \times 1) +$ $(0.32 \times 1) + (0.38 \times 1) +$ $(0.52 \times 1) + (0.16 \times 1)$ $= 1.50$ Total Area$= (0.12 \times 2) +$ $(0.32 \times 1) + (0.38 \times 1) +$ $(0.52 \times 1) + (0.16 \times 2)$ $= 1.78$ Proportion $= \frac{1.50}{1.78}$	0.84 or $\frac{75}{89}$	4	M1 for attempt to use frequency density × width e.g. 0.12×2 or 0.24 M1 for $(0.12 \times 2) + (0.32 \times 1) + (0.38 \times 1) + (0.52 \times 1) + (0.16 \times 2)$ or 1.78 seen M1 for $((0.12 \times 1) + (0.32 \times 1) + (0.38 \times 1) + (0.52 \times 1) + (0.16 \times 1))$/"1.78" A1 for answer which rounds to 0.84 or 84% or $\frac{75}{89}$ or equivalent vulgar fraction **OR** M1 for attempt to use area e.g. sight of any one of 4.8, 6.4, 7.6, 10.4 or 6.4 (cm^2) oe M1 for $4.8 + 6.4 + 7.6 + 10.4 + 6.4$ or 35.6 (cm^2) oe seen M1 for $(2.4 + 6.4 + 7.6 + 10.4 + 3.2)$ "35.6" oe A1 for answer which rounds to 0.843 or 84.3%% or $\frac{75}{89}$ or equivalent vulgar fraction

1MA1 Practice papers Set 6: Paper 3H (Regular) mark scheme – Version 1.0					
Question		**Working**	**Answer**	**Mark**	**Notes**
19			congruency proved	3	M1 for correct statement with correct reason M1 for a second correct statement with correct reason C1 for complete proof justifying congruency, eg SAS or AAS Eg *DAE* = *BCF* (opposite angles of parallelogram are equal) *AE* = *FC* (*E* and *F* are midpoints of lines of equal length) *AD* = *BC* (opposite sides of parallelogram are equal) *AED* ≡ *CFB* (SAS)
			explains why DE = FB	1	C1 for relevant statement using congruency Eg *DE* and *FB* are corresponding sides of congruent triangles

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	5MM2	2H	1411	Q07	Fractions	4	1.98	3.50	2.97	2.44	1.18	0.76	0.10
2	5MM2	2F	1506	Q20	Rearranging equations	2	0.14				0.51	0.15	0.03
3	1MA0	2F	1211	Q23	Compound measures	3	0.59				1.35	0.70	0.35
4	5MM2	2H	1211	Q18	Simultaneous equations	4	2.07	4.00	3.41	2.37	1.38	0.17	0.00
5	1380	2H	0906	Q19	Compound interest	5	3.41	4.93	4.59	3.68	2.25	0.94	0.35
6	5MM2	2H	1111	Q14	Trigonometry	5	1.62	3.93	3.28	1.63	0.55	0.45	0.00
7	4MA0	3H	1606	Q17	Solving quadratic equations	6	3.21	5.22	3.03	1.13	0.32	0.13	0.02
8	5MM2	2H	1406	Q10	Solve inequalities	5	3.77	4.81	4.52	3.98	3.18	2.25	0.82
9	4MA0	3H	1606	Q21	Probability	5	1.70	2.88	1.45	0.57	0.14	0.04	0.02
10	4MA0	4H	1606	Q10	LCM and HCF	2	1.26	1.78	1.20	0.76	0.40	0.23	0.16
11	5MM2	2H	1306	Q12	Reverse percentages	3	1.90	2.98	2.76	2.18	1.06	0.35	0.14
12	4MA0	4H	1606	Q21	Venn diagrams	4	2.04	3.15	1.80	0.94	0.4	0.15	0.05
13	4MA0	4H	1305	Q17	Functions	5	3.03	4.26	3.09	1.78	0.95	0.45	0.18
14	4MA0(R)	4H	1606	Q17	Trigonometry	5	2.33	4.36	2.96	1.36	0.47	0.14	0.02
15	5AM2	2H	1311	Q25	Proportional change	5	1.33	4.58	2.62	1.07	0.28	0.00	0.00
16	5MM2	2H	1106	Q24	Sine and cosine rule	6	1.30	5.46	3.05	0.73	0.23	0.02	0.00
17	4MA0(R)	4H	1606	Q21	Rearranging equations	4	1.00	2.72	0.66	0.11	0.01	0.01	0.00
18	5AM1	1H	1111	Q22	Histograms and grouped data	4	0.72	1.67	0.86	0.50	0.09	0.14	0.00
19	5MM2	2H	1311	Q26	Geometric proof	4	0.26	1.41	0.42	0.11	0.03	0.00	0.00
						80							