Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15 **Q1**	6.5	B1	oe	Accept (eg) $6\frac{1}{2}$ and $\sqrt{42.25}$

Paper: 1MA1/2H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
16 (a)	Correct graph	B2	for a circle radius 3.5, centre (0, 0)	Circle could be drawn freehand as long as it approximates to a circle
		(B1	for a circle centre (0, 0) of a different radius, **or** for a circle drawn of radius 3.5 centre not (0, 0) **or** incomplete correct circle)	
(b) **Q2**	$x = 2.0, y = -2.9$ $x = -1.2, y = 3.3$	M1	for $2x + y = 1$ drawn, **or** for correctly eliminating one variable, eg $x^2 + 1 - 4x + 4x^2 = 12.25$ or $x^2 + (1 - 2x)^2 = 12.25$	
		A1	for the pair of x values, **or** the correct pair of y values, **or** one correct pair of x/y values ft from (a) (dep on B1)	$2x + y = 1$ does not have to be shown Use professional judgment
		A1	for both correct pair of x/y values, unambiguously matched ft from (a) (dep on B1)	Accept values given as coordinates. Check graph for answers

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
23 **Q3**		$y = \dfrac{-3}{\sqrt{7}}x + \dfrac{8}{\sqrt{7}}$	M1	for method to find gradient of *OP*, eg $\frac{\sqrt{7}}{2} \div \frac{3}{2} \left(= \frac{\sqrt{7}}{3} \text{ or } 0.88\ldots \right)$ oe
			M1	(dep) for method to find gradient of tangent, *m*, eg. $\frac{\frac{\sqrt{7}}{2}}{\frac{3}{2}} \times m = -1 \left(m = \frac{-3}{\sqrt{7}} \text{ or } -1.13.. \right)$
			A1	for $y - \frac{\sqrt{7}}{2} = \frac{-3}{\sqrt{7}}(x - \frac{3}{2})$ or $y = \frac{-3\sqrt{7}}{7}x + \frac{8\sqrt{7}}{7}$ oe or $y - 1.32.. = -1.13..(x - 1.5)$

Paper 1MA1: 3H				
Question	**Working**	**Answer**	**Mark**	**Notes**
20 (a)		(0,1)	B1	(0,1)
(b) **Q4**		Circle radius 4 Centre (3,0) and (−1,0) and (7,0) labelled	M1	For centre (3,0) implied by drawing or label or a circle of radius 4 or intersections on the *x*-axis at −1or 7 implied by drawing or labels
			M1	for 2 of centre (3,0) implied by drawing or label intersections on the *x*-axis at −1 and 7 implied by drawing or label circle drawn with radius 4
			A1	for a fully correct answer

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
22 **Q5**	2.5	P1	use of $\sin 30 = \frac{1}{2}$ to find OA (= 8) or $OAB = 90°$ eg $OA = 16\sin30°$ or right angle marked on diagram	
		P1	recognition that equation of circle is $x^2 + y^2 = r^2$	Accept $3p^2 + p^2 = r^2$ for the award of this mark
		P1	Correct substitution of p, $3p$ and r in $x^2 + y^2 = r^2$ eg $9p^2 + p^2 = OA^2$ or $(3p)^2 + p^2 = \text{“8”}$	Do not accept $3p^2 + p^2 = 8^2$ for the award of this mark
		A1	for answer in the range 2.5 to 2.53	Accept $\sqrt{6.4}$ or $\frac{4\sqrt{10}}{5}$ If an answer within the given range is seen in working and rounded incorrectly award full marks. Award 0 marks for the answer without supportive working.

Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
22 **Q6**	$x^2 + y^2 = 80$	P1 P1 P1 P1 A1	for process to find gradient of tangent eg $\dfrac{10-0}{0--20}$ $(=\dfrac{1}{2})$ **or** for $20^2 + 10^2$ ($= 500$) **or** start to method to find angle between tangent and x axis, eg $\tan\theta = \dfrac{10}{20}$ for process to find gradient of normal/radius eg $\dfrac{-1}{\text{"}0.5\text{"}}$ $(=-2)$ **or** for $\sqrt{20^2 + 10^2}$ or $\sqrt{500}$ or 22.36... or 22.4 **or** completes process to find angle between tangent and x axis. eg $\theta = \tan^{-1}\left(\dfrac{10}{20}\right)$ $(=26.565\ldots)$ for equation of tangent eg $y =$ "0.5"$x + 10$ oe or for equation of radius eg $y =$ "–2"x oe **or** for using similar triangles eg $\dfrac{r}{10} = \dfrac{20}{\text{"}\sqrt{500}\text{"}}$ **or** for $\sin(\text{"}26.565\ldots\text{"}) = \dfrac{r}{20}$ for process to find the x coordinate eg "0.5"$x + 10 =$ "–2"x $(x = -4)$ **or** for $r = \dfrac{20}{\text{"}\sqrt{500}\text{"}} \times 10$ **or** $r = 20 \times \sin(\text{"}26.565\ldots\text{"})$ oe	 Accept $(4\sqrt{5})^2$ for 80

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
20	$x = 2.1$, $y = 5.1$ $x = -2.9$, $y = -4.7$	M1	for drawing the graph of $y - 2x = 1$	
Q7		A1	for one correct pair of values **or** for both correct x values, **or** for both correct y values	For both A marks accept answers in the ranges $x = 2.0$ to 2.2, $y = 5.0$ to 5.2 $x = -2.8$ to -3.0, $y = -4.6$ to -4.8
		A1	for both correct pairs, correctly matched	Accept values given as coordinates

Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
24 **Q8**	$6x + 8y = 35$	M1	for a process to find the gradient of the radius, eg $\frac{2.8-0}{2.1-0}$ $(=\frac{4}{3})$	
		M1	for process to find the gradient of the tangent, eg uses $\frac{-1}{"m"}$	
		M1	for substitution of $(2.1, 2.8)$ into $y = "\frac{-3}{4}"x + c$ or into $(y - y_1) = "\frac{-3}{4}"(x - x_1)$	
		A1	oe as long as in the form $ax + by = c$, where a, b and c are integers	

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
20 **Q9**	$7x + 5y - 82 = 0$	P1 P1 P1 A1	for process to work out the gradient of the line from the centre of the circle to the point (6,8) eg $\dfrac{8-3}{6--1}$ $(= \dfrac{5}{7})$ (dep P1) for using $mn = -1$ eg $-1 \div \text{``}\dfrac{5}{7}\text{''}$ $(= -\dfrac{7}{5})$     for substituting (6, 8) into $y = \text{``}-\dfrac{7}{5}\text{''}x + c$ **or** for $(y - 8) = \text{``}-\dfrac{7}{5}\text{''}(x - 6)$ **or** for $y = -\dfrac{7}{5}x + \dfrac{82}{5}$ oe $7x + 5y - 82 = 0$ oe SC B2 for answer of $5x + 7y - 86 = 0$ oe in any form	 Must be in form $ax + by + c = 0$ with integer coefficients, eg $82 - 7x - 5y = 0$