Question	Answer	Marks	Guidance
(a)	$1+1+a+b-12=0\left[\Rightarrow a+b=10\right]$ $4+36+2a-6b-12=0\left[\Rightarrow 2a-6b=-28\right]$	**B1 B1**	B1 for each equation. Allow unsimplified. Can be implied by correct values for a and b.
	$a=4, b=6$	**B1**	
	Centre is $\left(-\frac{their\ a}{2}, -\frac{their\ b}{2}\right)$ $[-2,-3]$	**B1 FT**	Or $x=-2, y=-3$
		4	

Question	Answer	Marks	Guidance
(b)	Gradient of AC is $\frac{1-their\ y}{1-their\ x}$ [= $\frac{1--3}{1--2}$= $\frac{1+3}{1+2}=\frac{4}{3}$]	***M1**	Using *their* centre correctly.
	Gradient of tangent is $=\frac{-1}{their\frac{4}{3}}\left[=-\frac{3}{4}\right]$	**A1 FT**	Use of $m_1m_2=-1$ to obtain the gradient of the tangent.
	Equation: $y-1=$'$their-\frac{3}{4}$'$(x-1)$ or $y=-\frac{3}{4}x+\frac{7}{4}$	**DM1**	Using $(1,1)$ with *their* gradient of the tangent at A.
	$3x+4y=7$ or $4y+3x=7$. or integer multiples of these	**A1**	
	Alternative method for question (b)		
	$2x+2y\frac{dy}{dx}+4+6\frac{dy}{dx}=0$	***M1**	Implicit differentiation with at least one y term differentiated correctly.
	$8\frac{dy}{dx}=-6\Rightarrow\frac{dy}{dx}=-\frac{6}{8}$	**A1**	
	Equation: $y-1=$'$their-\frac{3}{4}$'$(x-1)$ or $y=-\frac{3}{4}x+\frac{7}{4}$	**DM1**	Using $(1,1)$ with *their* gradient of the tangent at A.
	$3x+4y=7$ or $4y+3x=7$. or integer multiples of these	**A1**	
	Alternative method for question (b)		
	$\frac{dy}{dx}=\frac{1}{2}\{25-(x+2)^2\}^{-\frac{1}{2}}(-2x-4)$	***M1**	Rearranging to form $y=$ and differentiating using the chain rule.
	$\frac{dy}{dx}=\frac{1}{2}(25-9)^{-\frac{1}{2}}(-6)=-\frac{6}{8}$	**A1**	

Question	Answer	Marks	Guidance
(b)	Equation: $y-1=$ '*their* $-\frac{3}{4}$'$(x-1)$ or $y=-\frac{3}{4}x+\frac{7}{4}$	**DM1**	Using $(1,1)$ with *their* gradient of the tangent at *A*.
	$3x+4y=7$ or $4y+3x=7$. or integer multiples of these	**A1**	
		4	