Question	Answer	Marks	Guidance
10(a)	Gradient of $AB = \dfrac{-5-3}{8-4}$ $[=-2]$	**M1***	
	Midpoint $AB = \left(\dfrac{8+4}{2}, \dfrac{-5+3}{2}\right)$ $[(6,-1)]$	**M1**	
	Gradient of normal $= -\dfrac{1}{-2}\left[=\dfrac{1}{2}\right]$ and an attempt to find the required equation	**DM1**	Must be used to find equation of perpendicular through *their* $(6,-1)$.
	Equation of perpendicular bisector is $y+1=\dfrac{1}{2}(x-6)$, so $y=\dfrac{1}{2}x-4$	**A1**	WWW AG – working involving the perpendicular bisector must be seen.
	Alternative Method for Question 10(a)		
	$AC^2=(a-4)^2+(b-3)^2$, $BC^2=(a-8)^2+(b+5)^2$ both expanded	**M1***	
	Solving $AC=BC$ [= 10]	**DM1**	Only allow a single sign error.
	Eliminating a^2 and b^2	**DM1**	May be awarded before the previous DM1.
	$a=2b+8$, concluding $y=\dfrac{x}{2}-4$	**A1**	WWW
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Question	Answer	Marks	Guidance
10(b)	Using the centre as $\left(a,\ \frac{1}{2}a-4\right)$	M1	May see centre as $(2y+8, y)$ OE. May be seen in an incorrect equation.
	$(4-a)^2+(3-0.5a+4)^2=100$	M1	Sub in (4, 3) or (8, −5). Could use circle with $(6,-1)$ and $r=\sqrt{80}$.
	$1.25a^2-15a-35\ [=0] \Rightarrow a^2-12a-28\ [=0]\ \left(\text{or } b^2+2b-15\ [=0]\right)$	DM1	Obtain a 3-term quadratic in *their* x or y.
	$[(a-14)(a+2)=0] \Rightarrow a=14,\ a=-2$	A1	Or $[(b-3)(b+5)=[0]] \Rightarrow b=3,\ b=-5$.
	$\Rightarrow (x-14)^2+(y-3)^2=100$ and $(x+2)^2+(y+5)^2=100$	A1	
	Alternative Method 1 for the first 3 marks:		
	Make a or b the subject from a circle centre (a,b) using A or B	M1	E.g. $b=\sqrt{100-(y-3)^2}+4$ from circle through A. These equations may have been found in part **(a)**.
	Form an equation in a or b only	M1	Substitute *their* a or b into their second circle equation.
	Simplify to a quadratic in a or b	DM1	Expect $a^2-12a-28=0$ or $b^2+2b-15=0$, OE.
	Alternative Method 2 for the first 3 marks:		
	Obtaining CM (C, centre; M, mid-point of AB)	M1	Expect $\sqrt{80}$. Must be clear this is CM, not AB.
	Using the triangle CMT, where CT is parallel to the x-axis, to find the vertical distance of C from M, MT	DM1	Expect $MT=4$.
	Using the triangle CMT, where MT is parallel to the y-axis, to find the horizontal distance of C from M, CT	DM1	Expect $CT=8$.
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