

Q	Marking instructions	AO	Mark	Typical solution
12(a)	Substitutes $y = 0$ to form an equation for $x$ PI $x = 4$	3.1a	M1	$(x + y)^2 = 4y + 2x + 8$ $y = 0 \Rightarrow x^2 = 8 + 2x$
	Obtains $x = 4$ ignore any other value.	1.1b	A1	$\Rightarrow x = 4$ or $-2$ $x = 4$ at P
	Expands and uses product rule to obtain the derivative of their $Axy$ term.  or  Uses chain rule to obtain $2(x + y)\left(1 + \frac{dy}{dx}\right)$ Condone missing brackets.	3.1a	M1	$x^2 + 2xy + y^2 = 4y + 2x + 8$ $2x + 2y + 2x\frac{dy}{dx} + 2y\frac{dy}{dx} = 4\frac{dy}{dx} + 2$
	Uses implicit differentiation correctly to obtain the derivative of $4y$ or $y^2$ .	1.1b	B1	$4\frac{dy}{dx} = -6$
	Obtains correct equation from correct differentiation.	1.1b	A1	$\Rightarrow \frac{dy}{dx} = -\frac{3}{2}$
	Substitutes $x = 4$ and $y = 0$ into $\frac{dy}{dx} = \frac{2 - 2x - 2y}{2x + 2y - 4}$ OE  and obtains $-\frac{3}{2}$ If substituting into an earlier equation must reach $\frac{dy}{dx} = -\frac{3}{2}$ (AG)	2.1	R1	
	<b>Subtotal</b>		<b>6</b>	

Q	Marking instructions	AO	Mark	Typical solution
12(b)	Uses $\frac{2}{3}$ and $y = 0$ and their $x = 4$ from part (a) to form equation of line.	1.1a	M1	$y = \frac{2}{3}(x - 4)$ $2x - 3y = 8$
	Obtains their equation in correct form.	1.1b	A1F	
	<b>Subtotal</b>		<b>2</b>	

	<b>Question Total</b>		<b>8</b>	
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