TIE 10/01								
Question			Answer	Marks	AO	Guidance		
5			16a + 2b = 8	B1	3.1a	Substitute (4, 8) into the equation of the curve	Seen anywhere in solution Allow for unsimplified equation, even if error then occurs	
			$\frac{\mathrm{d}y}{\mathrm{d}x} = 2ax + \frac{b}{2\sqrt{x}}$	M1	2.1	Attempt differentiation	To obtain derivative of the form $px + qx^{-0.5}$ Can still be awarded if p and q now incorrect numerical values	
				A1	1.1	Obtain correct derivative		
			$\frac{\mathrm{d}y}{\mathrm{d}x} = 8a + \frac{1}{4}b$	M1	1.1	Use $x = 4$ correctly in their derivative	Must be an attempt at differentiation, but could still follow M0 Their derivative could now be part of an equation or an attempt at a perpendicular gradient	
			gradient of tangent is 13 OR	M1	1.1	Attempt to use the relationship between the gradients of perpendicular lines	Attempt the gradient of the tangent, using attempt at gradient of given normal (condone $-\frac{1}{13}x$ if recovered)	
			gradient of normal is $-\frac{1}{8a + \frac{1}{4}b}$			lines	OR	
			or gradient of normal is $-\frac{1}{2ax + \frac{b}{2\sqrt{x}}}$ OR				Attempt gradient of the normal using their derivative (either algebraic or in terms of <i>a</i> and <i>b</i>) Condone slips with fractions within fractions as long as intent is clear	
			$\left(8a + \frac{1}{4}b\right) \times -\frac{1}{13} = -1$				NB $\left(8a + \frac{1}{4}b\right) \times -\frac{1}{13} = -1$ would imply next M1 as well	

112 10/01				Harr Scholle		04110 2021	
Question		Answer	Marks	AO	Guidance		
		eg $8a + \frac{1}{4}b = 13$ or $-\frac{1}{8a + \frac{1}{4}b} = -\frac{1}{13}$	M1	2.2a	Equate expressions / values for normals or for tangents, with x now substituted Could be using gradients or equations	Must be comparing like with like ie tangent with tangent, or normal with normal If using equations then would need to equate expressions for either the gradients or the intercepts	
		$8a + \frac{1}{4}b = 13$ oe	A1	1.1	Obtain correct linear equation	If using eg $-\frac{1}{8a + \frac{1}{4}b} = -\frac{1}{13}$ then terms in the	
						denominators must have been dealt with correctly	
		a = 2, b = -12	A1	1.1	Obtain $a = 2, b = -12$	BC so no method needed	
			[8]				