

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

