Implicit Differentiation Exam Questions (From OCR 4724)

Q1, (Jun 2007, Q6)

The equation of a curve is $x^2 + 3xy + 4y^2 = 58$. Find the equation of the normal at the point (2, 3) on the curve, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers. [8]

Q2, (Jan 2008, Q4)

Find the equation of the normal to the curve

$$x^3 + 4x^2y + y^3 = 6$$

at the point (1, 1), giving your answer in the form $ax + by + c = 0$, where a, b and c are integers. [6]

Q3, (Jan 2009, Q8)

The equation of a curve is $x^3 + y^3 = 6xy$.

(i) Find $\frac{dy}{dx}$ in terms of x and y. **[4]**

(ii) Show that the point $(2^{\frac{4}{3}}, 2^{\frac{5}{3}})$ lies on the curve and that $\frac{dy}{dx} = 0$ at this point. **[4]**

(iii) The point (a, a), where $a > 0$, lies on the curve. Find the value of a and the gradient of the curve at this point. **[4]**

Q4, (Jun 2009, Q8)

(i) Given that $14x^2 - 7xy + y^2 = 2$, show that $\frac{dy}{dx} = \frac{28x - 7y}{7x - 2y}$. **[4]**

(ii) The points L and M on the curve $14x^2 - 7xy + y^2 = 2$ each have x-coordinate 1. The tangents to the curve at L and M meet at N. Find the coordinates of N. **[6]**

Q5, (Jun 2010, Q5)

Find the coordinates of the two stationary points on the curve with equation

$$x^2 + 4xy + 2y^2 + 18 = 0.$$ **[7]**

Q6, (Jan 2013, Q3)

The equation of a curve is $xy^2 = x^2 + 1$. Find $\frac{dy}{dx}$ in terms of x and y, and hence find the coordinates of the stationary points on the curve. **[7]**

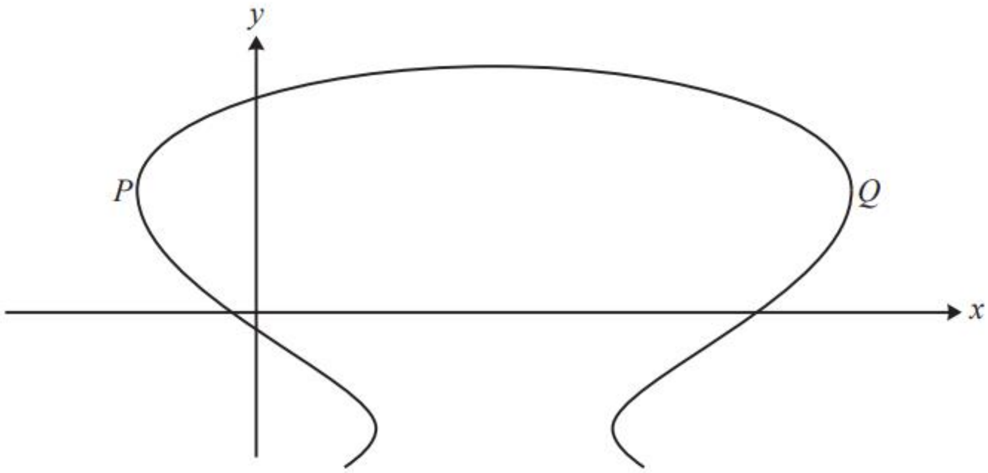
Q7, (Jun 2015, Q7)

A curve has equation $(x+y)^2 = xy^2$. Find the gradient of the curve at the point where $x = 1$. **[7]**

Q8, (Jun 2016, Q3)

Given that $y\sin 2x + \frac{1}{x} + y^2 = 5$, find an expression for $\frac{dy}{dx}$ in terms of x and y. **[5]**

Q9, (Jun 2014, Q6)



The diagram shows the curve with equation $x^2 + y^3 - 8x - 12y = 4$. At each of the points P and Q the tangent to the curve is parallel to the y-axis. Find the coordinates of P and Q. **[8]**