1. Consider the curve with equation $x^2 + xy + y^2 = 3$.

(a) Find in terms of k, the gradient of the curve at the point $(-1, k)$.

(5)

(b) Given that the tangent to the curve is parallel to the x-axis at this point, find the value of k.

(1)

(Total 6 marks)

2. Find the gradient of the curve $e^{xy} + \ln(y^2) + e^y = 1 + e$ at the point $(0, 1)$.

(Total 7 marks)

3. Find the gradient of the tangent to the curve $x^3 y^2 = \cos(\pi y)$ at the point $(-1, 1)$.

(Total 6 marks)