Applications of Differentiation

Question Paper 6

Level	A Level
Subject	Maths
Exam Board	OCR
Topic	Differentiation
Sub Topic	Applications of Differentiation
Booklet	Question Paper 6

Time Allowed: **55 minutes**

Score: **/45**

Percentage: **/100**

1 A curve has equation $y = (x + 2)(x^2 - 3x + 5)$.

(i) Find the coordinates of the minimum point, justifying that it is a minimum. **[8]**

(ii) Calculate the discriminant of $x^2 - 3x + 5$. **[2]**

(iii) Explain why $(x + 2)(x^2 - 3x + 5)$ is always positive for $x > -2$. **[2]**

2 **(i)** Find the equation of the tangent to the curve $y = 7 + 6x - x^2$ at the point P where $x = 5$, giving your answer in the form $ax + by + c = 0$. **[6]**

(ii) This tangent meets the x-axis at Q. Find the coordinates of the mid-point of PQ. **[3]**

(iii) Find the equation of the line of symmetry of the curve $y = 7 + 6x - x^2$. **[2]**

(iv) State the set of values of x for which $7 + 6x - x^2$ is an increasing function. **[2]**

3 Find the equation of the normal to the curve $y = x^3 - 4x^2 + 7$ at the point $(2, -1)$, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers. **[7]**

4 The quadratic equation $kx^2 - 30x + 25k = 0$ has equal roots. Find the possible values of k. **[4]**

5 The curve $y = x^3 + px^2 + 2$ has a stationary point when $x = 4$. Find the value of the constant p and determine whether the stationary point is a maximum or minimum point. **[7]**