7.1 Applications of Differentiation

Question Paper

Course	Edexcel IAL Maths: Pure 2
Section	7. Differentiation
Topic	7.1 Applications of Differentiation
Difficulty	Easy

Time allowed: **40**

Score: **/30**

Percentage: **/100**

Question 1

(i) Find an expression for $f'(x)$ when $f(x) = x^3 + x^2 - 5x$.

(ii) Solve the equation $3x^2 + 2x - 5 = 0$.

(iii) Hence, or otherwise, find the values of x for which $f(x)$ is a decreasing function.

[6 marks]

Question 2

The curve C has equation $y = 3x^3 + 6x^2 - 5x + 1$.

(a) Find expressions for $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$.

[3 marks]

Question 2

(b) (i) Evaluate $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ when $x = \frac{1}{3}$.

(ii) What does your answer to part (b) tell you about curve C at the point where $x = \frac{1}{3}$?

[4 marks]

Question 3

Find the values of x for which $f(x) = 2x^2 - 16x$ is an increasing function.

[3 marks]

Question 4

Find the x-coordinates of the stationary points on the curve with equation

$$y = \frac{1}{3}x^3 + \frac{5}{2}x^2 - 6x + 2.$$

[4 marks]

Question 5

Show that the point $(2\ ,1)$ is a (local) maximum point on the curve with equation

$$y = 2x^2 - \frac{2}{3}x^3 - \frac{5}{3}.$$

[5 marks]

Question 6

(a) Find the value of $\frac{\mathrm{d}y}{\mathrm{d}x}$ and $\frac{\mathrm{d}^2y}{\mathrm{d}x^2}$ at the point where $x = 2$ for the curve with equation $y = x^3 - 6x^2 + 9x + 4$.

[4 marks]

Question 6

(b) Explain why $x = 2$ is **not** a stationary point.

[1 mark]