4.1 Differentiation

Question Paper

Course	Edexcel IAL Maths: Pure 1
Section	4. Differentiation
Topic	4.1 Differentiation
Difficulty	Easy

Time allowed: **50**

Score: **/42**

Percentage: **/100**

Question 1

Differentiate

(i) $5x$,
(ii) $2x^3$,
(iii) $x^{\frac{1}{2}}$.

[3 marks]

Question 2

(a) Write down the gradient of the line with equation $y = k$, where k is a constant.

[1 mark]

Question 2

(b) Find the gradient at the point where $x = 8$ for the following functions

(i) $f(x) = 3x^2$,
(ii) $f(x) = 4x^3 - 2x$,
(iii) $f(x) = 3x^{\frac{1}{3}}$.

[3 marks]

Question 3

(i) Expand $(x + 3)(x - 2)$.

(ii) Hence differentiate $(x + 3)(x - 2)$.

[3 marks]

Question 4

Given that $y = 2x^{\frac{1}{2}} + 3x^{-1}$, find $\frac{dy}{dx}$.

[2 marks]

Question 5

Find the x-coordinate of the point on the curve $y = 5x^2 - 16x$ where the gradient is 4.

[3 marks]

Question 6

Find the coordinates of the points on the curve $y = 2x^3 - 9x^2 + 12x$ where the gradient is 0.

[4 marks]

Question 7

Find $\frac{dy}{dx}$ when $y = \left(\sqrt{x}\right)^3 + \frac{2}{\sqrt{x}}$.

[3 marks]

Question 8

(a) The function $f(x)$ is given by

$$f(x) = \frac{2x^{\frac{1}{3}} + 3x^{\frac{2}{3}}}{x}.$$

Show that $f(x)$ can be written in the form $f(x) = ax^b + cx^d$, where a, b, c and d are constants to be found.

[3 marks]

Question 8

(b) Find $f'(x)$.

[3 marks]

Question 9

(a) Find an expression for $\frac{dy}{dx}$ when $y = 3x^2 - 2x$.

[2 marks]

Question 9

(b) Find the gradient of $y = 3x^2 - 2x$ at the points where

(i) $x = 3$,
(ii) $x = -2$.

[2 marks]

Question 10

(i) Find the gradient of the tangent at the point $(2, 3)$ on the graph of $y = 2x^3 - 3x^2 - 1$.
(ii) Hence find the equation of the tangent at the point $(2, 3)$.

[5 marks]

Question 11

(a) For the graph with equation $y = 3x - \frac{1}{2}x^2$, find the gradient of the tangent at the point where $x = 5$.

[2 marks]

Question 11

(b) (i) Find the gradient of the normal at the point where $x = 5$.

(ii) Hence find the equation of the normal at the point where $x = 5$.

[3 marks]