Basic Integration

Question Paper

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Integration
Sub Topic	Basic Integration
Booklet	Question Paper

Time Allowed: **54 minutes**

Score: **/45**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 The function f is such that $f'(x) = 5 - 2x^2$ and $(3, 5)$ is a point on the curve $y = f(x)$. Find $f(x)$. [3]

2 A curve is such that $\frac{dy}{dx} = (2x + 1)^{\frac{1}{2}}$ and the point $(4, 7)$ lies on the curve. Find the equation of the curve. [4]

3 A curve is such that $\frac{dy}{dx} = \frac{12}{\sqrt{(4x + a)}}$, where a is a constant. The point $P(2, 14)$ lies on the curve and the normal to the curve at P is $3y + x = 5$.

(i) Show that $a = 8$. [3]

(ii) Find the equation of the curve. [4]

4 The equation of a curve is $y = \frac{2}{\sqrt{(5x - 6)}}$.

(i) Find the gradient of the curve at the point where $x = 2$. [3]

(ii) Find $\int \frac{2}{\sqrt{(5x - 6)}}\,dx$ and hence evaluate $\int_2^3 \frac{2}{\sqrt{(5x - 6)}}\,dx$. [4]

5 A curve is such that $\frac{dy}{dx} = \frac{6}{x^2}$ and $(2, 9)$ is a point on the curve. Find the equation of the curve. [3]

6 A curve is such that $\frac{dy}{dx} = \sqrt{(2x + 5)}$ and $(2, 5)$ is a point on the curve. Find the equation of the curve. [4]

7 Find the term independent of x in the expansion of $\left(2x + \frac{1}{x^2}\right)^6$. [3]

8 Find $\int \left(x^3 + \frac{1}{x^3}\right) \mathrm{d}x$. [3]

9 **(a)** Differentiate $\frac{2x^3 + 5}{x}$ with respect to x. [3]

(b) Find $\int (3x - 2)^5 \, \mathrm{d}x$ and hence find the value of $\int_0^1 (3x - 2)^5 \, \mathrm{d}x$. [4]

10 A curve is such that $\frac{\mathrm{d}y}{\mathrm{d}x} = 2x^2 - 5$. Given that the point (3, 8) lies on the curve, find the equation of the curve. [4]