

APPLICATIONS OF INTEGRATION PAST PAPERS QUESTIONS
EDEXCEL A LEVEL YEAR 1

1.

The gradient of the curve C is given by

$$\frac{dy}{dx} = (3x-1)^2.$$

The point $P(1, 4)$ lies on C .

(a) Find an equation of the normal to C at P . (4)

(b) Find an equation for the curve C in the form $y = f(x)$. (5)

(c) Using $\frac{dy}{dx} = (3x-1)^2$, show that there is no point on C at which the tangent is parallel to the line $y = 1 - 2x$. (2)

2.

The curve with equation $y = f(x)$ passes through the point $(1, 6)$. Given that

$$f'(x) = 3 + \frac{5x^2 + 2}{x^{\frac{1}{2}}}, \quad x > 0,$$

find $f(x)$ and simplify your answer.

(7)

3.

The curve C has equation $y = f(x)$, $x \neq 0$, and the point $P(2, 1)$ lies on C . Given that

$$f'(x) = 3x^2 - 6 - \frac{8}{x^2},$$

(a) find $f(x)$.

(5)

(b) Find an equation for the tangent to C at the point P , giving your answer in the form $y = mx + c$, where m and c are integers.

(4)

4.

The curve C has equation $y = f(x)$, $x > 0$, and $f'(x) = 4x - 6\sqrt{x} + \frac{8}{x^2}$.

Given that the point $P(4, 1)$ lies on C ,

(a) find $f(x)$ and simplify your answer.

(6)

(b) Find an equation of the normal to C at the point $P(4, 1)$.

(4)

5.

A curve has equation $y = f(x)$ and passes through the point $(4, 22)$.

Given that

$$f'(x) = 3x^2 - 3x^{\frac{1}{2}} - 7,$$

use integration to find $f(x)$, giving each term in its simplest form.

(5)

6.

$$\frac{dy}{dx} = 5x^{-\frac{1}{2}} + x\sqrt{x}, \quad x > 0$$

Given that $y = 35$ at $x = 4$, find y in terms of x , giving each term in its simplest form. (7)

7.

The curve with equation $y = f(x)$ passes through the point $(-1, 0)$.

Given that

$$f'(x) = 12x^2 - 8x + 1$$

find $f(x)$.

(5)

8.

A curve with equation $y = f(x)$ passes through the point $(2, 10)$. Given that

$$f'(x) = 3x^2 - 3x + 5$$

find the value of $f(1)$.

(5)

9.

$$\frac{dy}{dx} = -x^3 + \frac{4x - 5}{2x^3}, \quad x \neq 0$$

Given that $y = 7$ at $x = 1$, find y in terms of x , giving each term in its simplest form. (6)