Integration 2 - Edexcel Past Exam Questions

1. 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)
Jan 12 Q7

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2. Find

$$\int \left(6x^2 + \frac{2}{x^2} + 5 \right) dx,$$

giving each term in its simplest form.

(4)
June 12 Q1

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3. The point P (4, −1) lies on the curve C with equation $y = f(x)$, $x > 0$, and

$$f'(x) = \frac{1}{2}x - \frac{6}{\sqrt{x}} + 3.$$

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

(4)

(*b*) Find f(x).

(4)
June 12 Q7

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

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

(6)
Jan 13 Q8

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5. Find

$$\int \left(10x^4 - 4x - \frac{3}{\sqrt{x}} \right) dx,$$

giving each term in its simplest form.

(4)
June 13 Q2

6.
$$f'(x) = \frac{(3 - x^2)^2}{x^2}, \qquad x \neq 0.$$

(a) Show that $f'(x) = 9x^{-2} + A + Bx^2$, where A and B are constants to be found. **(3)**

(b) Find $f''(x)$. **(2)**

Given that the point $(-3, 10)$ lies on the curve with equation $y = f(x)$,

(c) find $f(x)$. **(5)**

June 13 Q9

7. Find
$$\int \left(3x^2 - \frac{4}{x^2} \right) dx,$$

giving each term in its simplest form. **(4)**

June 13(R) Q3

8. A curve has equation $y = f(x)$. The point P with coordinates $(9, 0)$ lies on the curve.

Given that
$$f'(x) = \frac{x + 9}{\sqrt{x}}, \qquad x > 0,$$

(a) find $f(x)$. **(6)**

(b) Find the x-coordinates of the two points on $y = f(x)$ where the gradient of the curve is equal to 10. **(4)**

June 13(R) Q10

9. Find $\int (8x^3 + 4)\ dx$, giving each term in its simplest form. **(3)**

June 14 Q1

10. A curve with equation $y = f(x)$ passes through the point (4, 25).

Given that $f'(x) = \dfrac{3}{8}x^2 - 10x^{-\frac{1}{2}} + 1, \quad x > 0,$

(a) find $f(x)$, simplifying each term. **(5)**

(b) Find an equation of the normal to the curve at the point (4, 25). Give your answer in the form $ax + by + c = 0$, where a, b and c are integers to be found. **(5)**

June 14 Q10

11. Given that $y = 2x^5 + \dfrac{6}{\sqrt{x}}$, $x > 0$, find in their simplest form

(a) $\dfrac{dy}{dx}$ **(3)**

(b) $\int y\,dx$ **(3)**

June 14(R) Q4

12. $$\frac{dy}{dx} = 6x^{-\frac{1}{2}} + x\sqrt{x}, \qquad x > 0$$

Given that $y = 37$ at $x = 4$, find y in terms of x, giving each term in its simplest form. **(7)**

June 14(R) Q8

13. Given that $y = 4x^3 - \dfrac{5}{x^2}$, $x \neq 0$, find in their simplest form

(a) $\dfrac{dy}{dx}$, **(3)**

(b) $\displaystyle\int y\ dx$. **(3)**

June 15 Q3

14. A curve with equation $y = f(x)$ passes through the point (4, 9).

Given that

$$f'(x) = \frac{3\sqrt{x}}{2} - \frac{9}{4\sqrt{x}} + 2, \quad x > 0,$$

(*a*) find f(x), giving each term in its simplest form. **(5)**

Point P lies on the curve.

The normal to the curve at P is parallel to the line $2y + x = 0$.

(*b*) Find the *x*-coordinate of *P*. **(5)**

June 15 Q10

15. Find

$$\int \left(2x^4 - \frac{4}{\sqrt{x}} + 3 \right) dx$$

giving each term in its simplest form. **(4)**

June 16 Q1

16. Given that

$$y = 3x^2 + 6x^{\frac{1}{3}} + \frac{2x^3 - 7}{3\sqrt{x}}, \quad x > 0,$$

find $\dfrac{dy}{dx}$. Give each term in your answer in its simplified form. **(6)**

June 16 Q7

17. Find

$$\int \left(2x^5 - \frac{1}{4x^3} - 5 \right) dx$$

giving each term in its simplest form. **(4)**

June 17 Q1

18. The curve C has equation $y = f(x)$, $x > 0$, where

$$f'(x) = 30 + \frac{6 - 5x^2}{\sqrt{x}}$$

Given that the point $P(4, -8)$ lies on C,

(*a*) find the equation of the tangent to C at P, giving your answer in the form $y = mx + c$, where m and c are constants. **(4)**

(*b*) Find $f(x)$, giving each term in its simplest form. **(5)**

June 17 Q7