

1. Given that

$$y = 4x^3 - 1 + 2x^{\frac{1}{2}}, \quad x > 0,$$

find $\frac{dy}{dx}$.

(4)

Lined area for student response.

(Total 4 marks)

Q1



1. Find $\int (2 + 5x^2) dx$.

(3)

Q1

(Total 3 marks)



Leave
blank

1. Find $\int (3x^2 + 4x^5 - 7) dx$. (4)

(Total 4 marks)

Q1



4. 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. (a) Show that $(4 + 3\sqrt{x})^2$ can be written as $16 + k\sqrt{x} + 9x$, where k is a constant to be found.

(2)

(b) Find $\int(4 + 3\sqrt{x})^2 dx$.

(3)

Handwritten area with horizontal lines for working.

Q6

(Total 5 marks)



6. Given that $\frac{6x+3x^{\frac{5}{2}}}{\sqrt{x}}$ can be written in the form $6x^p + 3x^q$,

(a) write down the value of p and the value of q .

(2)

Given that $\frac{dy}{dx} = \frac{6x+3x^{\frac{5}{2}}}{\sqrt{x}}$, and that $y = 90$ when $x = 4$,

(b) find y in terms of x , simplifying the coefficient of each term.

(5)



2. Given that $y = 2x^5 + 7 + \frac{1}{x^3}$, $x \neq 0$, find, in their simplest form,

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

(b) $\int y \, dx$. **(4)**

Horizontal lines for writing answers.



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3. Given that $y = 3x^2 + 4\sqrt{x}$, $x > 0$, find

(a) $\frac{dy}{dx}$, (2)

(b) $\frac{d^2y}{dx^2}$, (2)

(c) $\int y \, dx$. (3)

