



4. Given that  $y = 2x^2 - \frac{6}{x^3}$ ,  $x \neq 0$ ,

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

(2)

(b) find  $\int y \, dx$ .

(3)

Handwritten student work area with horizontal lines.

Q4

(Total 5 marks)



1. Given that

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

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

(4)

Q1

(Total 4 marks)







JAW 2009

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2. Find  $\int(12x^5-8x^3+3) dx$ , giving each term in its simplest form.

(4)

Q2

(Total 4 marks)



QAW 2009

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

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

(2)

Given that  $y = 5x^4 - 3 + \frac{2x^2 - x^{\frac{3}{2}}}{\sqrt{x}}$ ,

(b) find  $\frac{dy}{dx}$ , simplifying the coefficient of each term.

(4)

















9.

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

(a) Show that  $f(x) = 9x^{-\frac{1}{2}} + Ax^{\frac{1}{2}} + B$ , where  $A$  and  $B$  are constants to be found.

(3)

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

(3)

(c) Evaluate  $f'(9)$ .

(2)

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MA 4 2006

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1. Find  $\int (6x^2 + 2 + x^{-1}) dx$ , giving each term in its simplest form.

(4)

Q1

(Total 4 marks)





MAY 2006

5. Differentiate with respect to  $x$

(a)  $x^4 + 6\sqrt{x}$ ,

(3)

(b)  $\frac{(x+4)^2}{x}$ .

(4)

Leave  
blank



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)

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7. Given that

$$y = 8x^3 - 4\sqrt{x} + \frac{3x^2 + 2}{x}, \quad x > 0$$

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

(6)

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1. Find

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

giving each term in its simplest form.

(4)

Q1

(Total 4 marks)



4.

$$y = 5x^3 - 6x^{\frac{4}{3}} + 2x - 3$$

(a) Find  $\frac{dy}{dx}$  giving each term in its simplest form. (4)

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

A series of horizontal lines for writing the solution to the differentiation problems.



11. The curve  $C$  has equation

$$y = 2x - 8\sqrt{x} + 5, \quad x \geq 0$$

- (a) Find  $\frac{dy}{dx}$ , giving each term in its simplest form. (3)

The point  $P$  on  $C$  has  $x$ -coordinate equal to  $\frac{1}{4}$

- (b) Find the equation of the tangent to  $C$  at the point  $P$ , giving your answer in the form  $y = ax + b$ , where  $a$  and  $b$  are constants. (4)

The tangent to  $C$  at the point  $Q$  is parallel to the line with equation  $2x - 3y + 18 = 0$

- (c) Find the coordinates of  $Q$ . (5)

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