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



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

(2)

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

(3)

04

(Total 5 marks)

L.	Given that			1			
			$y = 4x^3 - 1 + 2$	$2x^2,  x>0,$			
	find $\frac{\mathrm{d}y}{\mathrm{d}x}$ .						
							(4)
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Find $\int (3x^2 + 4x^5 - 7) dx$ .	(4)
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5.	(a)	Write $\frac{2\sqrt{x+3}}{x}$ in the form $2x^p+3x^q$ where p and q are constants.
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(2)

Given that 
$$y = 5x - 7 + \frac{2\sqrt{x+3}}{x}$$
,  $x > 0$ ,  
(b) find  $\frac{dy}{dx}$ , simplifying the coefficient of each term.

(4)

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2. Find $\int (12x^5 - 8x^3 + 3) dx$ , giving each term in its simplest form.		Le bl.
	(4)	
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	•	Q2
(Total	4 marks)	

- 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)

(5)
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- 1. Given that  $y = x^4 + 6x^{\frac{1}{2}}$ , find in their simplest form
  - (a)  $\frac{dy}{dx}$

(3)

(b)  $\int y \, \mathrm{d}x$ 

(3)

2

(3)
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3
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	$f(x) = 3x + x^3, \qquad x > 0.$	
(a) Differentiate to find $f'(x)$	).	
		(2)
Given that $f'(x) = 15$ ,		
(b) find the value of $x$ .		(3)
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- 3. Given that  $y = 2x^3 + \frac{3}{x^2}$ ,  $x \ne 0$ , find
  - (a)  $\frac{\mathrm{d}y}{\mathrm{d}x}$

(3)

(b)  $\int y \, dx$ , simplifying each term.

(3)

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(	$(3-4\sqrt{x})$	2	
$f(x) = \frac{1}{2}$	$\sqrt{x}$	<del>-</del> ,	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)

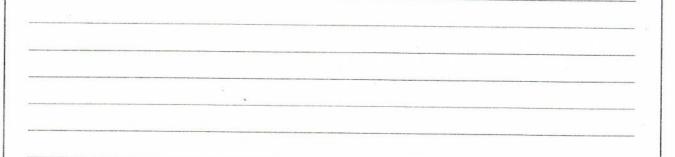
(c) Evaluate f'(9).

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Find $\int (6x^2 + 2 + x^{-\frac{1}{2}}) dx$ , giving each term in its simplest form.	5.25	
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- 3. Given that  $y = 3x^2 + 4\sqrt{x}$ , x > 0, find b
  - (a)  $\frac{\mathrm{d}y}{\mathrm{d}x}$ ,

(2)

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

(2)

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

(3)

	$\int (8x^3 + 6x^{\frac{1}{2}} - 5)  \mathrm{d}x$	
giving each term in	its simplest form.	(0)
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(Total 4 marks)

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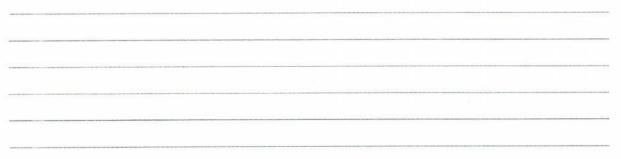
$$y = 8x^3 - 4\sqrt{x} + \frac{3x^2 + 2}{x}, \quad x > 0$$

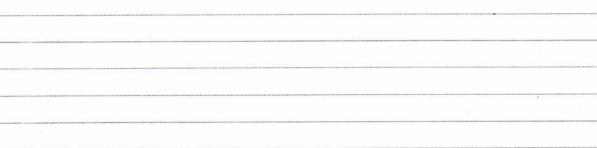
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- 2. Given that  $y = 2x^5 + 7 + \frac{1}{x^3}$ ,  $x \ne 0$ , find, in their simplest form,
  - (a)  $\frac{\mathrm{d}y}{\mathrm{d}x}$ ,

(3)

(b)  $\int y \, \mathrm{d}x$ .

(4)

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

giving each term in its simplest form.		
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(Total 4 marks)



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			$y = 5x^3 - 6x^{\frac{4}{3}}$	+2x-3
(a)	Find	dy	giving each term in its simplest	form.

(4)

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

4.

(2)

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11. The curve C has equation

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

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

giving each term in its simplest form.

(4)

Q2

(Total 4 marks)



9.

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

(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)