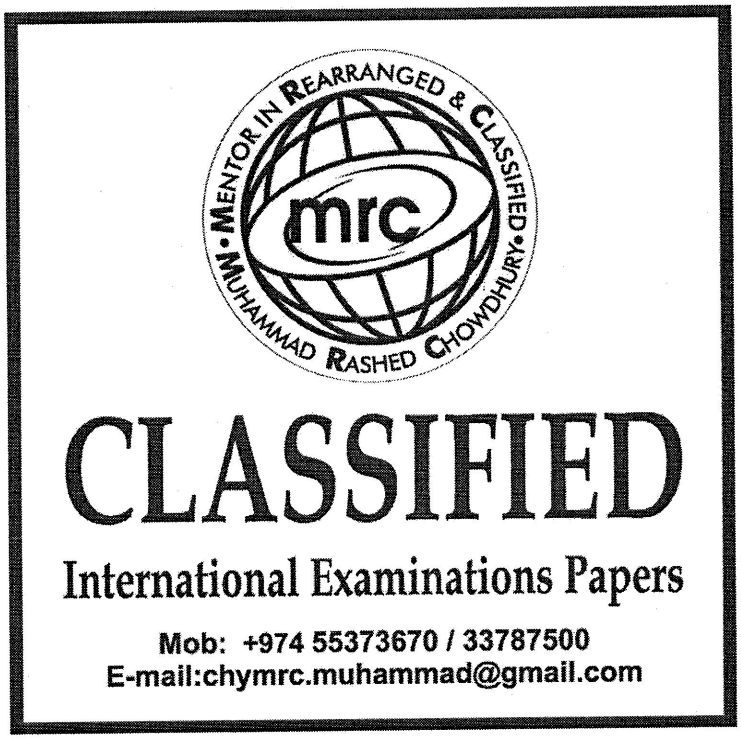

MODULAR MATHEMATICS/CORE-1

TOPIC-Differentiation

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1. Given that

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

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

Jan-07

(4)

Q1

(Total 4 marks)

Leave blank

2. Given

$$y = \sqrt{x} + \frac{4}{\sqrt{x}} + 4, \qquad x > 0$$

find the value of $\frac{dy}{dx}$ when $x = 8$, writing your answer in the form $a\sqrt{2}$, where a is a rational number.

Jun-17

(5)

Leave blank

1. Given that $y = x^4 + x^{\frac{1}{3}} + 3$, find $\frac{dy}{dx}$.

(3)

4x-10

Q1

(Total 3 marks)

Leave blank

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 $\frac{d^2y}{dx^2}$

JW-12

(2)

Leave blank

5. Differentiate with respect to x

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

(3)

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

(4)

Leave blank

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)

Leave blank

5. (a) Write $\frac{2\sqrt{x}+3}{x}$ in the form $2x^p+3x^q$ where p and q are constants.

Ja-08 **(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)

Leave blank

7. Given that

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

find $\frac{dy}{dx}$. Give each term in your answer in its simplified form.

(6)

Leave blank

7. Given that

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

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

Jn-10

(6)

Leave blank

Q9

9.

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

(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)

Leave blank

7. Differentiate with respect to x, giving each answer in its simplest form.

(a) $(1 - 2x)^2$

(3)

(b) $\dfrac{x^5 + 6\sqrt{x}}{2x^2}$

Jn-14

(4)

Leave blank

4. $f(x) = 3x + x^3, \quad x > 0.$

(a) Differentiate to find $f'(x)$.

(2)

Given that $f'(x) = 15$,

(b) find the value of x.

(3)