YEAR 1 DIFFERENTIATION QUESTIONS - EDEXCEL

1,

(i) Given that $y = 5x^3 + 7x + 3$, find

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

(b) $\frac{d^2y}{dx^2}$. **(1)**

2.

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

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

3.

Given that

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

find $\frac{dy}{dx}$. **(4)**

4.

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

Given that $y = 5x - 7 + \frac{2\sqrt{x}+3}{x}, \quad x > 0,$

(b) find $\frac{dy}{dx}$, simplifying the coefficient of each term. **(4)**

5.

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)

6.

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

(3)

7.

The curve C has equation

$$y = \frac{1}{2}x^3 - 9x^{\frac{3}{2}} + \frac{8}{x} + 30, \qquad x > 0$$

(a) Find $\frac{dy}{dx}$.

(4)

(b) Show that the point $P(4, -8)$ lies on C.

(2)

(c) Find an equation of the normal to C at the point P, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(6)