

1. Differentiate $y = \frac{2x^3 - 3x + 4}{x}$ with respect to x , where $x \neq 0$. 3

2. Find the rate of change of $f(x) = \frac{1}{3x^2}$ when $x = 2$. 3

3. The function f is defined for $x \in \mathbb{R}$ by $f(x) = x^4 - 2x^2$.
 - (a) Find the coordinates of the points where the graph of $y = f(x)$ crosses the x -axis. 3
 - (b) Find the stationary points and determine their nature. 6
 - (c) Sketch the graph of $y = f(x)$, showing the features found in parts (a) and (b). 3

4. A curve has equation $y = \frac{4}{3}\sqrt{x}$. Find the equation of the tangent to the curve at the point where $y = 4$. 5

5. A function is defined for $x > 0$ by $f(x) = \sqrt{x^3} + \frac{2}{3x^2}$.
Given that $f'(4) = \frac{k}{48}$ find the value of k . 5

28 Marks