

Week 4: Differentiation

Try these exercises now, do not use a calculator, and try to solve the exercises without help

1. $y = 2x^3 + 5x^2 - 7x + 10$

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

(b) Find the gradient of the curve when $x = 2$

2. $y = 4\sqrt{x} + \frac{1}{2x} + 10$

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

3. $y = x^3 - 4x^2 - 3x + 9$

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

(b) Find the range values of x for which y is increasing

4. Let $g(x) = 5x^2 + 4\sin(3x)$ Find $g'(x)$

5. Given that $f(x) = \frac{x}{(x+2)}$ find $f'(x)$

(a) using the product rule,

(b) using the quotient rule.

6. $y = \frac{x^2}{x+4}$ Find $y'(x)$

7. Differentiate with respect to x

(a) $(x^2 - 4)^3$

(b) $2(3x^2 + 1)^6$

(c) e^{x^2+3x}