



SPTA

Higher Homework

Differentiation (A)



1. Differentiate the following with respect to x :

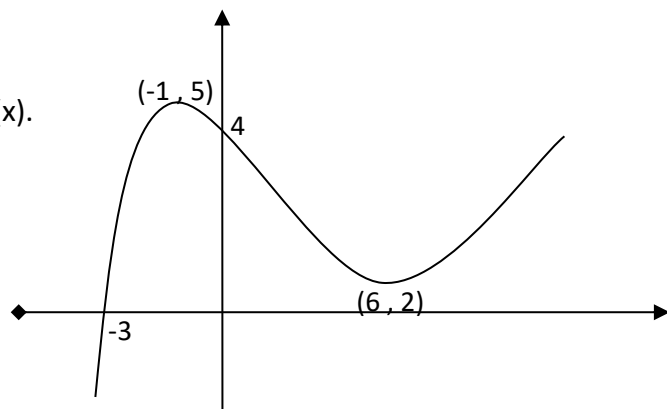
(a) $f(x) = \frac{3}{x^4} + 5\sqrt{x^3} - 6$

(b) $y = \frac{3x^3 + 5x^2 - 3x}{x^2}$ (4)

2. Find the rate of change of the function $y = 3x^2 + 5x - 2$ when $x = -3$ (2)

3. Find the equation of the tangent to the curve $y = \sqrt{x} - 2$ at $x = 9$ (4)

4. For the curve $y = f(x)$ opposite, sketch the graph of the derived function $y = f'(x)$.



5. (a) Find the stationary points on the curve with equation

$$y = x^3 - 9x^2 + 24x - 20$$

and justify their nature. (7)

(b) (i) Show that $(x - 2)^2(x - 5) = x^3 - 9x^2 + 24x - 20$.

(ii) Hence sketch the graph of $y = x^3 - 9x^2 + 24x - 20$. (4)

6. The gradient of the tangent at A to the curve $y = 3x^2 - 4x + 1$ is 2.
Find the coordinates of A. (3)