

1996 Paper II Question 8

Let $f(x) = \frac{(x-1)^3}{(x+1)^2}$.

- a. Find $f'(x)$ and $f''(x)$ for $x \neq -1$. (2 marks)
- b. Determine the values of x for each of the following cases:
 - (i) $f'(x) > 0$,
 - (ii) $f'(x) < 0$,
 - (iii) $f''(x) > 0$,
 - (iv) $f''(x) < 0$. (3 marks)
- c. Find the relative extreme point(s) and point(s) of inflexion of $f(x)$. (2 marks)
- d. Find the asymptote(s) of $f(x)$. (2 marks)
- e. Sketch the graph of $f(x)$. (2 marks)
- f. Let $g(x) = |f(x)|$. Does $g'(1)$ exist? Find the asymptote(s) and sketch the graph of $g(x)$. (4 marks)