1995 Paper II Question 9

Let $f(x) = \frac{|x|}{(x+1)^2}$, where $x \neq -1$.

a. (i) Find $f'(x)$ and $f''(x)$ for $x > 0$.

(ii) Find $f'(x)$ and $f''(x)$ for $x < 0$.

(iii) Show that $f'(0)$ does not exist.

(4 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) $f''(x) > 0$.

(4 marks)

c. Find the relative extreme point(s) and point(s) of inflexion of $f(x)$. (3 marks)

d. Find the asymptote(s) and sketch the graph of $f(x)$. (4 marks)