9. The function f is defined by

$$f(x) = \frac{(x+5)(x+1)}{(x+4)} - \ln(x+4) \qquad x \in \mathbb{R} \qquad x > k$$

(a) State the smallest possible value of k.

(1)

(b) Show that

$$f'(x) = \frac{ax^2 + bx + c}{(x+4)^2}$$

where a, b and c are integers to be found.

(4)

(c) Hence show that f is an increasing function.

(2)