

It is given that a curve has equation  $y = k(3x - k)^{-1} + 3x$ , where  $k$  is a constant.

**(a)** Find, in terms of  $k$ , the values of  $x$  at which there is a stationary point.

[4]

[illegible]

The function  $f$  has a stationary value at  $x = a$  and is defined by

$$f(x) = 4(3x - 4)^{-1} + 3x \quad \text{for } x \geq \frac{3}{2}.$$

- (b) Find the value of  $a$  and determine the nature of the stationary value. [3]

[illegible]

- (c) The function  $g$  is defined by  $g(x) = -(3x + 1)^{-1} + 3x$  for  $x \geq 0$ .

Determine, making your reasoning clear, whether  $g$  is an increasing function, a decreasing function or neither. [2]

This image shows a full page of white paper with ten horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and extend across the entire width of the page. There is no text or other markings on the paper.