

4 Functions f and g are defined for all real values of x by

$$f(x) = \frac{x-k}{2} \text{ and } g(x) = x^2 + kx + 5, \text{ where } k \text{ is a constant.}$$

You are given that the equation $f^{-1}g(x) = 4 - 2kx$ has real distinct roots.

(a) Show that k satisfies the inequality $2k^2 - k - 6 > 0$. [5]

(b) **In this question you must show detailed reasoning.**

Hence find the set of values of k . Give your answer in set notation. [3]