5. The functions f and g are defined by

$$f(x) = \frac{kx}{2x-1} \qquad x \in \mathbb{R} \qquad x \neq \frac{1}{2}$$

$$g(x) = 2 + 3x - x^2 \qquad x \in \mathbb{R}$$

where k is a non-zero constant.

(a) Find in terms of k

(i) fg(4)

(ii) the range of f

(iii) f^{-1}

(6)

Given that

$$f^{-1}(2) = \frac{11}{3g(2)}$$

(b) find the exact value of k

(2)