3   The functions f and g are defined for $x \in \mathbb{R}$ by

$$f : x \mapsto 4x - 2x^2,$$
$$g : x \mapsto 5x + 3.$$

   (i) Find the range of f. [2]

   (ii) Find the value of the constant k for which the equation $gf(x) = k$ has equal roots. [3]