10 Functions f and g are defined by

$$\mathrm{f} : x \mapsto 2x - 3, \quad x \in \mathbb{R},$$
$$\mathrm{g} : x \mapsto x^2 + 4x, \quad x \in \mathbb{R}.$$

(i) Solve the equation $\mathrm{ff}(x) = 11$. [2]

(ii) Find the range of g. [2]

(iii) Find the set of values of x for which $\mathrm{g}(x) > 12$. [3]

(iv) Find the value of the constant p for which the equation $\mathrm{gf}(x) = p$ has two equal roots. [3]

Function h is defined by $\mathrm{h} : x \mapsto x^2 + 4x$ for $x \geqslant k$, and it is given that h has an inverse.

(v) State the smallest possible value of k. [1]

(vi) Find an expression for $\mathrm{h}^{-1}(x)$. [4]