

**11** Functions  $f$  and  $g$  are defined by

$$\begin{aligned} f : x &\mapsto 2x^2 - 8x + 10 && \text{for } 0 \leq x \leq 2, \\ g : x &\mapsto x && \text{for } 0 \leq x \leq 10. \end{aligned}$$

- (i) Express  $f(x)$  in the form  $a(x + b)^2 + c$ , where  $a$ ,  $b$  and  $c$  are constants. [3]
- (ii) State the range of  $f$ . [1]
- (iii) State the domain of  $f^{-1}$ . [1]
- (iv) Sketch on the same diagram the graphs of  $y = f(x)$ ,  $y = g(x)$  and  $y = f^{-1}(x)$ , making clear the relationship between the graphs. [4]
- (v) Find an expression for  $f^{-1}(x)$ . [3]