- The function f is defined by  $f(x) = 3 + 6x 2x^2$  for  $x \in \mathbb{R}$ .
  - (a) Express f(x) in the form  $a-b(x-c)^2$ , where a, b and c are constants, and state the range [3]

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(b) The graph of y = f(x) is transformed to the graph of y = h(x) by a reflection in one of the axes followed by a translation. It is given that the graph of y = h(x) has a minimum point at the origin.


Give details of the reflection and translation involved.

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The function g is defined by  $g(x) = 3 + 6x - 2x^2$  for  $x \le 0$ .

(c) Sketch the graph of y = g(x) and explain why g is a one-one function. You are not required to find the coordinates of any intersections with the axes.
[2]

(d) Sketch the graph of  $y = g^{-1}(x)$  on your diagram in (c), and find an expression for  $g^{-1}(x)$ . You should label the two graphs in your diagram appropriately and show any relevant mirror line. [4]