

7 The function  $f$  is defined by  $f : x \mapsto 7 - 2x^2 - 12x$  for  $x \in \mathbb{R}$ .

(i) Express  $7 - 2x^2 - 12x$  in the form  $a - 2(x + b)^2$ , where  $a$  and  $b$  are constants. [2]

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(ii) State the coordinates of the stationary point on the curve  $y = f(x)$ . [1]

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The function  $g$  is defined by  $g : x \mapsto 7 - 2x^2 - 12x$  for  $x \geq k$ .

**(iii)** State the smallest value of  $k$  for which  $g$  has an inverse.

[1]

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(iv) For this value of  $k$ , find  $g^{-1}(x)$ .

[3]

[illegible]