9 **(a)** Express $4x^2 - 12x + 13$ in the form $(2x + a)^2 + b$, where a and b are constants. [2]

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The function f is defined by $f(x) = 4x^2 - 12x + 13$ for $p < x < q$, where p and q are constants. The function g is defined by $g(x) = 3x + 1$ for $x < 8$.

(b) Given that it is possible to form the composite function gf, find the least possible value of p and the greatest possible value of q. [3]

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(c) Find an expression for $\mathrm{gf}(x)$. [1]

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The function h is defined by $\mathrm{h}(x) = 4x^2 - 12x + 13$ for $x < 0$.

(d) Find an expression for $\mathrm{h}^{-1}(x)$. [3]

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