**11** **(a)** The one-one function f is defined by $f(x) = (x - 3)^2 - 1$ for $x < a$, where $a$ is a constant.

**(i)** State the greatest possible value of $a$. [1]

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**(ii)** It is given that $a$ takes this greatest possible value. State the range of f and find an expression for $f^{-1}(x)$. [3]

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**(b)** The function g is defined by $g(x) = (x - 3)^2$ for $x \geqslant 0$.

**(i)** Show that $gg(2x)$ can be expressed in the form $(2x - 3)^4 + b(2x - 3)^2 + c$, where $b$ and $c$ are constants to be found. [2]

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**(ii)** Hence expand $gg(2x)$ completely, simplifying your answer. [4]

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