**9** The following functions are defined for $x > 1$.

$$\mathrm{f}(x) = \frac{x+3}{x-1} \qquad \mathrm{g}(x) = 1 + x^2$$

**(a)** Find $\mathrm{fg}(x)$. [2]

**(b)** Find $\mathrm{g}^{-1}(x)$. [2]

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**(c) DO NOT USE A CALCULATOR IN THIS PART OF THE QUESTION.**

Solve the equation $f(x) = g(x)$. [5]