2 The function f is defined by $f(x) = 1 - 4x - x^2$ for all real values of x.

(a) Write $f(x)$ in the form $a - (x + b)^2$, where a and b are constants. [2]

(b) Find the range of f. [1]

The function g is defined by $g(x) = 1 - 4x - x^2$ for $x \geqslant k$, where k is a constant.

(c) State the least possible value of k such that g has an inverse. [1]

(d) Using your value of k, find $g^{-1}(x)$, stating its domain and range. [5]

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3 **(a)** Show that $(2\tan\theta+\sec\theta)(2\tan\theta-\sec\theta) = 3\tan^2\theta - 1$. [2]

(b) Hence solve the equation $(2\tan\theta+\sec\theta)(2\tan\theta-\sec\theta) = 1$ for $0° \leqslant \theta \leqslant 180°$. [4]