

- 8** **(a)** Express $-3x^2 + 12x + 2$ in the form $-3(x - a)^2 + b$, where a and b are constants. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

The one-one function f is defined by $f : x \mapsto -3x^2 + 12x + 2$ for $x \leq k$.

- (b)** State the largest possible value of the constant k . [1]

.....

.....

.....

.....

It is now given that $k = -1$.

- (c)** State the range of f . [1]

.....

.....

.....

.....

- (d) Find an expression for $f^{-1}(x)$.

[3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

The result of translating the graph of $y = f(x)$ by $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$ is the graph of $y = g(x)$.

- (e) Express $g(x)$ in the form $px^2 + qx + r$, where p , q and r are constants.

[3]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.