4.

## Solution

To find the vertex, we look at the coefficients in the function $e(d)=ad^2+bd+c$
in this equation, $a=1$ and $b=9$
The first coordinate of the vertex has the formula: $\frac{-b}{2a}$ now, plugging into formula to get:
$\frac{-b}{2a}=-\frac{9}{2(1)}=-\frac{9}{2}$
The second coordinate of the vertex is $e(-\frac{9}{2}) = 1(-\frac{9}{2})^2+9(-\frac{9}{2})-3$
$=-\frac{93}{4}$
Therefore, the vertex of the graph of f is $(-\frac{9}{2},-\frac{93}{4})$