4.

Solution

To find the vertex, we look at the coefficients in the function $h(k)=ak^2+bk+c$
in this equation, $a=3$ and $b=6$
The first coordinate of the vertex has the formula: $\frac{-b}{2a}$ now, plugging into formula to get:
$\frac{-b}{2a}=-\frac{6}{2(3)}=-1$
The second coordinate of the vertex is $h(-1)=3(-1)^2+6(-1)-5$
$=-8$
Therefore, the vertex of the graph of f is $(-1,-8)$