1.

Solution

To find the vertex, we look at the coefficients in the function $q(j)=aj^2+bj+c$
in this equation, $a=2$ and $b=9$
The first coordinate of the vertex has the formula: $\frac{-b}{2a}$ now, plugging into formula to get:
$\frac{-b}{2a}=-\frac{9}{2(2)}=-\frac{9}{4}$
The second coordinate of the vertex is $q(-\frac{9}{4}) = 2(-\frac{9}{4})^2+9(-\frac{9}{4})-4$
$=-\frac{113}{8}$
Therefore, the vertex of the graph of f is $(-\frac{9}{4},-\frac{113}{8})$