5.

Solution

To find the vertex, we look at the coefficients in the function $r(f)=af^2+bf+c$
in this equation, $a=3$ and $b=9$
The first coordinate of the vertex has the formula: $\frac{-b}{2a}$ now, plugging into formula to get:
$\frac{-b}{2a}=-\frac{9}{2(3)}=-\frac{3}{2}$
The second coordinate of the vertex is $r(-\frac{3}{2}) = 3(-\frac{3}{2})^2+9(-\frac{3}{2})-3$
$=-\frac{39}{4}$
Therefore, the vertex of the graph of f is $(-\frac{3}{2},-\frac{39}{4})$