5.

Solution

To find the vertex, we look at the coefficients in the function $g(z) = az^2 + bz + c$
in this equation, $a = 1$ and $b = 3$
The first coordinate of the vertex has the formula: $\frac{-b}{2a}$ now, plugging into formula to get:

$\frac{-b}{2a} = -\frac{3}{2(1)} = -\frac{3}{2}$

The second coordinate of the vertex is $g(-\frac{3}{2}) = 1(-\frac{3}{2})^2 + 3(-\frac{3}{2}) - 3$

$= -\frac{21}{4}$

Therefore, the vertex of the graph of f is $(-\frac{3}{2}, -\frac{21}{4})$