

1.

Solution

To find the vertex, we look at the coefficients in the function $j(s) = as^2 + bs + c$
in this equation, $a = 2$ and $b = 4$

The first coordinate of the vertex has the formula: $\frac{-b}{2a}$ now, plugging into formula to get:

$$\frac{-b}{2a} = -\frac{4}{2(2)} = -1$$

The second coordinate of the vertex is $j(-1) = 2(-1)^2 + 4(-1) - 3$
 $= -5$

Therefore, the vertex of the graph of f is $(-1, -5)$