

5.

Solution

To find the vertex, we look at the coefficients in the function $f(r) = ar^2 + br + c$ in this equation, $a = 3$ and $b = 4$

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

$$\frac{-b}{2a} = -\frac{4}{2(3)} = -\frac{2}{3}$$

$$\begin{aligned}\text{The second coordinate of the vertex is } f\left(-\frac{2}{3}\right) &= 3\left(-\frac{2}{3}\right)^2 + 4\left(-\frac{2}{3}\right) - 4 \\ &= -\frac{16}{3}\end{aligned}$$

Therefore, the vertex of the graph of f is $\left(-\frac{2}{3}, -\frac{16}{3}\right)$