

5.

Solution

To find the vertex, we look at the coefficients in the function $v(m) = am^2 + bm + c$ 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:

$$\frac{-b}{2a} = -\frac{9}{2(3)} = -\frac{3}{2}$$

$$\begin{aligned}\text{The second coordinate of the vertex is } v\left(-\frac{3}{2}\right) &= 3\left(-\frac{3}{2}\right)^2 + 9\left(-\frac{3}{2}\right) - 3 \\ &= -\frac{39}{4}\end{aligned}$$

Therefore, the vertex of the graph of f is $\left(-\frac{3}{2}, -\frac{39}{4}\right)$