4.

Solution

To find the vertex, we look at the coefficients in the function $d(r) = ar^2 + br + c$

in this equation, $a = 1$ and $b = 4$

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

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

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

$= -8$

Therefore, the vertex of the graph of f is $(-2, -8)$