5.

Solution

Quadratic function: is a function that can be written in the form:

$e(q)=aq^2+bq+c$ where a, b, and c are real numbers and $a\neq 0$

we have $e(q)=q^2-12q-19$, note: $q^2-12q-19$ is in qe-plane

Here, we know that $a=1$, $b=-12$, $c=-19$

Since $a>0$,we know that the e-coordinate of the vertex is a minimum. However,to find the e-coordinate of our vertex we first need to find the q-coordinate of the vertex by using $q=-\frac{b}{2a}=-\frac{-12}{2}=6$ Now that we have the q-coordinate, we can find the e-coordinate

of the vertex by finding $e(6)=1(6)^2-12(6)-19=36-72-19=-55$ Minimum=-55