5.

Solution

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

$e(k) = ak^2 + bk + c$ where a, b, and c are real numbers and $a \neq 0$

we have $e(k) = -2k^2 - 5k - 23$, note: $-2k^2 - 5k - 23$ is in ke-plane

Here, we know that $a = -2$, $b = -5$, $c = -23$

Since $a < 0$,we know that the e-coordinate of the vertex is a maximum.However,to find the e-coordinate of our vertex we first need to find the k-coordinate of the vertex by using $k = -\frac{b}{2a} = -\frac{-5}{-4} = -\frac{5}{4}$ Now that we have the k-coordinate, we can find the e-coordinate of the vertex by finding $e\left(-\frac{5}{4}\right) = -2\left(-\frac{5}{4}\right)^2 - 5\left(-\frac{5}{4}\right) - 23 = -\frac{25}{8} + \frac{25}{4} - 23 = -\frac{159}{8}$ Maximum $= -\frac{159}{8}$