

5.

Solution

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

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

we have $y(k) = 2k^2 + 5k + 12$, note: $2k^2 + 5k + 12$ is in ky -plane

Here, we know that $a=2$, $b=5$, $c=12$

Since $a > 0$, we know that the y -coordinate of the vertex is a minimum. However, to find the y -coordinate of our vertex we first need to find the k -coordinate of the vertex by using $k = -\frac{b}{2a} = -\frac{5}{2 \cdot 2} = -\frac{5}{4}$. Now that we have the k -coordinate, we can find the y -coordinate

of the vertex by finding $y(-\frac{5}{4}) = 2(-\frac{5}{4})^2 + 5(-\frac{5}{4}) + 12 = \frac{25}{8} - \frac{25}{4} + 12 = \frac{71}{8}$ Minimum = $\frac{71}{8}$