4.

Solution

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

$u(j)=aj^2+bj+c$ where a, b, and c are real numbers and $a\neq 0$

we have $u(j)=j^2+12j+10$, note: $j^2+12j+10$ is in ju-plane

Here, we know that $a=1$, $b=12$, $c=10$

Since $a>0$,we know that the u-coordinate of the vertex is a minimum. However,to find the u-coordinate of our vertex we first need to find the j-coordinate of the vertex by using $j=-\frac{b}{2a}=-\frac{12}{2}=-6$ Now that we have the j-coordinate, we can find the u-coordinate of the vertex by finding $u(-6)=(-6)^2+12(-6)+10=36-72-10=-26$ Minimum=-26