

4.

Solution

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

$u(f) = af^2 + bf + c$ where a , b , and c are real numbers and $a \neq 0$

we have $u(f) = 3f^2 + 9f + 10$, note: $3f^2 + 9f + 10$ is in f - u -plane

Here, we know that $a=3$, $b=9$, $c=10$

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 f -coordinate of the vertex by using $f = -\frac{b}{2a} = -\frac{9}{6} = -\frac{3}{2}$. Now that we have the f -coordinate, we can find the u -coordinate

of the vertex by finding $u(-\frac{3}{2}) = 3(-\frac{3}{2})^2 + 9(-\frac{3}{2}) + 10 = \frac{27}{4} - \frac{27}{2} + 10 = \frac{13}{4}$. Minimum = $\frac{13}{4}$