4.

Solution

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

$u(m)=am^2+bm+c$ where a, b, and c are real numbers and $a\neq 0$

we have $u(m)=-2m^2-10m-10$, note: $-2m^2-10m-10$ is in mu-plane

Here, we know that $a=-2$, $b=-10$, $c=-10$

Since $a<0$,we know that the u-coordinate of the vertex is a maximum.However,to find the u-coordinate of our vertex we first need to find the m-coordinate of the vertex by using $m=-\frac{b}{2a}=-\frac{-10}{-4}=-\frac{5}{2}$ Now that we have the m-coordinate, we can find the u-coordinate of the vertex by finding $u(-\frac{5}{2})=-2(-\frac{5}{2})^2-10(-\frac{5}{2})-10=-\frac{25}{2}+25-10=\frac{5}{2}$ Maximum$=\frac{5}{2}$