

1.

Solution

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

$z(u) = au^2 + bu + c$ where a , b , and c are real numbers and $a \neq 0$

we have $z(u) = 3u^2 - 2u - 16$, note: $3u^2 - 2u - 16$ is in uz -plane

Here, we know that $a=3$, $b=-2$, $c=-16$

Since $a > 0$, we know that the z -coordinate of the vertex is a minimum. However, to find the z -coordinate of our vertex we first need to find the u -coordinate of the vertex by using $u = -\frac{b}{2a} = -\frac{-2}{6} = \frac{1}{3}$ Now that we have the u -coordinate, we can find the z -coordinate

of the vertex by finding $z\left(\frac{1}{3}\right) = 3\left(\frac{1}{3}\right)^2 - 2\left(\frac{1}{3}\right) - 16 = \frac{1}{3} - \frac{2}{3} - 16 = -\frac{49}{3}$ Minimum $= -\frac{49}{3}$