1.

Solution

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

$y(z)=az^2+bz+c$ where a, b, and c are real numbers and $a\neq 0$

we have $y(z)=3z^2+z-22$, note: $3z^2+z-22$ is in zy-plane

Here, we know that $a=3$, $b=1$, $c=-22$

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 z-coordinate of the vertex by using $z=-\frac{b}{2a}=-\frac{1}{6}=-\frac{1}{6}$ Now that we have the z-coordinate, we can find the y-coordinate of the vertex by finding $y(-\frac{1}{6})=3(-\frac{1}{6})^2+1(-\frac{1}{6})-22=\frac{1}{12}-\frac{1}{6}-22=-\frac{265}{12}$ Minimum$=-\frac{265}{12}$