3.

Solution

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

$r(s)=as^2+bs+c$ where a, b, and c are real numbers and $a\neq 0$

we have $r(s)=3s^2-14s-22$, note: $3s^2-14s-22$ is in sr-plane

Here, we know that $a=3$, $b=-14$, $c=-22$

Since $a>0$,we know that the r-coordinate of the vertex is a minimum. However,to find the r-coordinate of our vertex we first need to find the s-coordinate of the vertex by using $s=\frac{-b}{2a}=\frac{-14}{6}=\frac{7}{3}$ Now that we have the s-coordinate, we can find the r-coordinate of the vertex by finding $r(\frac{7}{3})=3(\frac{7}{3})^2-14(\frac{7}{3})-22=\frac{49}{3}-\frac{98}{3}-22=-\frac{115}{3}$ Minimum$=-\frac{115}{3}$