4.

Solution

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

$e(n)=an^2+bn+c$ where a, b, and c are real numbers and $a\neq 0$

we have $e(n)=3n^2-13n-8$, note: $3n^2-13n-8$ is in ne-plane

Here, we know that $a=3$, $b=-13$, $c=-8$

Since $a>0$,we know that the e-coordinate of the vertex is a minimum. However,to find the e-coordinate of our vertex we first need to find the n-coordinate of the vertex by using $n=-\frac{b}{2a}=-\frac{-13}{6}=\frac{13}{6}$ Now that we have the n-coordinate, we can find the e-coordinate of the vertex by finding $e(\frac{13}{6})=3(\frac{13}{6})^2-13(\frac{13}{6})-8=\frac{169}{12}-\frac{169}{6}-8=-\frac{265}{12}$ Minimum $=-\frac{265}{12}$