

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 $e(n) = -3n^2 - 9n + 21$, note: $-3n^2 - 9n + 21$ is in ne-plane

Here, we know that $a = -3$, $b = -9$, $c = 21$

Since $a < 0$, we know that the e-coordinate of the vertex is a maximum. However, to find the e-coordinate of our vertex we first need to find the n-coordinate of the vertex by using $n = -\frac{b}{2a} = -\frac{-9}{-6} = -\frac{3}{2}$. Now that we have the n-coordinate, we can find the e-coordinate

of the vertex by finding $e(-\frac{3}{2}) = -3(-\frac{3}{2})^2 - 9(-\frac{3}{2}) + 21 = -\frac{27}{4} + \frac{27}{2} + 21 = \frac{111}{4}$ Maximum = $\frac{111}{4}$