3.

Solution

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

$j(v) = av^2 + bv + c$ where a, b, and c are real numbers and $a \neq 0$

we have $j(v) = 2v^2 + 2v - 24$, note: $2v^2 + 2v - 24$ is in vj-plane

Here, we know that $a = 2$, $b = 2$, $c = -24$

Since $a > 0$, we know that the j-coordinate of the vertex is a minimum. However, to find the j-coordinate of our vertex we first need to find the v-coordinate of the vertex by using $v = -\frac{b}{2a} = -\frac{2}{4} = -\frac{1}{2}$ Now that we have the v-coordinate, we can find the j-coordinate of the vertex by finding $j(-\frac{1}{2}) = 2(-\frac{1}{2})^2 + 2(-\frac{1}{2}) - 24 = \frac{1}{2} - 1 - 24 = -\frac{49}{2}$ Minimum $= -\frac{49}{2}$