

3.

## Solution

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

$w(j) = aj^2 + bj + c$  where  $a$ ,  $b$ , and  $c$  are real numbers and  $a \neq 0$

we have  $w(j) = -j^2 - 7j$ , note:  $-j^2 - 7j$  is in  $jw$ -plane

Here, we know that  $a = -1$ ,  $b = -7$ ,  $c = 0$

Since  $a < 0$ , we know that the  $w$ -coordinate of the vertex is a maximum. However, to find the  $w$ -coordinate of our vertex we first need to find the  $j$ -coordinate of the vertex by using  $j = -\frac{b}{2a} = -\frac{-7}{-2} = -\frac{7}{2}$ . Now that we have the  $j$ -coordinate, we can find the  $w$ -coordinate

of the vertex by finding  $w(-\frac{7}{2}) = -1(-\frac{7}{2})^2 - 7(-\frac{7}{2}) - 0 = -\frac{49}{4} + \frac{49}{2} - 0 = \frac{49}{4}$  Maximum =  $\frac{49}{4}$