

5.

Solution

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

$x(y) = ay^2 + by + c$ where a , b , and c are real numbers and $a \neq 0$

we have $x(y) = -y^2 + 7y + 7$, note: $-y^2 + 7y + 7$ is in yx -plane

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

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

of the vertex by finding $x\left(\frac{7}{2}\right) = -1\left(\frac{7}{2}\right)^2 + 7\left(\frac{7}{2}\right) + 7 = -\frac{49}{4} + \frac{49}{2} + 7 = \frac{77}{4}$ Maximum = $\frac{77}{4}$