2.

Solution

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

$q(u) = au^2 + bu + c$ where a, b, and c are real numbers and $a \neq 0$

we have $q(u) = u^2 + 7u + 8$, note: $u^2 + 7u + 8$ is in uq-plane

Here, we know that $a=1$, $b=7$, $c=8$

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

of the vertex by finding $q(-\frac{7}{2}) = 1(-\frac{7}{2})^2 + 7(-\frac{7}{2}) + 8 = \frac{49}{4} - \frac{49}{2} + 8 = -\frac{17}{4}$ Minimum $= -\frac{17}{4}$