5.

Solution

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

$t(d)=ad^2+bd+c$ where a, b, and c are real numbers and $a\neq 0$

we have $t(d)=-d^2+d-19$, note: $-d^2+d-19$ is in dt-plane

Here, we know that $a=-1$, $b=1$, $c=-19$

Since $a<0$,we know that the t-coordinate of the vertex is a maximum.However,to find the t-coordinate of our vertex we first need to find the d-coordinate of the vertex by using $d=-\frac{b}{2a}=-\frac{1}{-2}=\frac{1}{2}$ Now that we have the d-coordinate, we can find the t-coordinate of the vertex by finding $t\left(\frac{1}{2}\right)=-1\left(\frac{1}{2}\right)^2+1\left(\frac{1}{2}\right)-19=-\frac{1}{4}+\frac{1}{2}-19=-\frac{75}{4}$ Maximum$=-\frac{75}{4}$