**2.**

## Solution

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

$u(r)=ar^2+br+c$ where a, b, and c are real numbers and $a\neq 0$

we have $u(r)=-2r^2+4r+18$, note: $-2r^2+4r+18$ is in ru-plane

Here, we know that $a=-2$, $b=4$, $c=18$

Since $a<0$ ,we know that the u-coordinate of the vertex is a maximum.However,to find the u-coordinate of our vertex we first need to find the r-coordinate of the vertex by using $r=-\frac{b}{2a}=-\frac{4}{-4}=1$ Now that we have the r-coordinate, we can find the u-coordinate

of the vertex by finding $u(1)=-2(1)^2+4(1)+18=-2+4+18=20$ Maximum=20