

Me: Find the maximum value of  $f(x) = (x-2)^2 + 2$  on the interval  $[0,5]$

ChatGPT:

To find the maximum value of  $f(x) = (x-2)^2 + 2$  on the interval  $[0,5]$ , we can start by evaluating the function at the endpoints of the interval,  $x = 0$  and  $x = 5$ .

At  $x = 0$ ,  $f(0) = (0-2)^2 + 2 = 4$  At  $x = 5$ ,  $f(5) = (5-2)^2 + 2 = 9$

Since the function is continuous on the interval  $[0,5]$ , we can also find the maximum value of the function by finding the value of  $x$  that maximizes the function. To do this, we can take the derivative of the function and set it equal to 0:

$$f'(x) = 2(x-2) = 0 \quad x-2 = 0 \quad x = 2$$

At  $x = 2$ ,  $f(2) = (2-2)^2 + 2 = 2$

Therefore, the maximum value of  $f(x)$  on the interval  $[0,5]$  is  $f(2) = 2$ .

It's worth noting that this is a local maximum, as the function does not have a global maximum on the interval  $[0,5]$ . The function is defined for all values of  $x$ , and the values of the function can become arbitrarily large as  $x$  becomes larger in magnitude.