

General comment 1. As you're grading your own quiz, pay attention to the difference between *what the max/min is* and *where it is attained*. When we ask for the max or min, we are asking for the largest or smallest *function value*. When we ask where it is attained, we want the *x-value or values that give that largest or smallest function value*. So, for example, answers to Problem 1 were of the form

Absolute max is [some function value], attained at x =[some x-value].

Absolute min is [some function value], attained at x =[some x-value].

I don't care if you word it exactly that way (for example, you could leave out the word "attained").

General comment 2. Another issue is "what function we put the endpoints and critical points into". Remember, the derivative is around only to let you find critical points. Once you have critical points, you want to test them *in the original function $f(x)$* . Why? Because we are trying to find biggest/smallest values of the original function $f(x)$.

1. Find the absolute maximum **and** the absolute minimum of $f(x) = x^2 - 4x + 3$ on the interval $[0, 3]$ **and** say where (i.e. at what x -value) they are attained.

Compute $f'(x) = 2x - 4$. Solve for when it is zero: $x = 2$. Test critical point and end points:

$$f(0) = 3, \quad f(2) = -1, \quad f(3) = 0.$$

Absolute max is 3, attained at $x = 0$.

Absolute min is -1 , attained at $x = 2$.

2. There is some function $f(x)$ on the interval $(-\infty, \infty)$ and here is what you know about it:

Critical points are $x = -3$, $x = -1$, and $x = 7$.

$$f(-3) = 6$$

$$f(-1) = 2$$

$$f(7) = 9$$

$$\lim_{x \rightarrow -\infty} f(x) = 11$$

$$\lim_{x \rightarrow \infty} f(x) = 8$$

Max does not exist, because the limit as $x \rightarrow -\infty$ is greater than the function values at the critical points.

Min is 2.