MATH 1743: Finding Extrema With an Interval

(1) Plug the given function into $Y_1$. Sketch the graph of the function on the given interval (i.e. enter the interval into the $X_{\text{min}}$ and $X_{\text{max}}$ values in your calculator window, then hit ZoomFit). Label all extrema as a relative minimum or a relative maximum and approximate their corresponding $x$-values. Label the endpoints as well if the problems says to determine the absolute maximum and the absolute minimum.

(2) Find the derivative of the given function, and plug it into $Y_2$.

(3) Use solver to find the points in the given interval where the derivative equals 0. (Use the above $x$-value approximations as your “guesses” so the calculator knows where you want it to search.) Additionally, write down any $x$-values where the derivative does not exist (the only times this will happen: when the function does not exist, when there is a vertical tangent line, where the graph makes a sharp point).

(4) Plug the $x$-values found in part (3) back into the original function to find their corresponding $y$-values. If finding the absolute minimum or maximum, plug in the endpoints to find their $y$-values as well.

(5) Label and write out all relative extrema appropriately (this is why we labeled them ahead of time in step 1). If the problem asks for the absolute minimum, select the point(s) found in the previous steps with the smallest $y$-value (including the endpoints). If the problem asks for the absolute maximum, select the point(s) found in the previous steps with the largest $y$-value (including the endpoints).