According to the Standards:
Instructional programs from preK-grade 12 should enable students to:

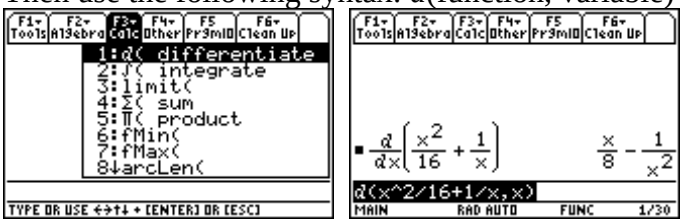
- Solve problems that arise in mathematics and in other contexts
- Build new mathematical knowledge through problem solving
- Apply and adapt a variety of appropriate strategies to solve problems
- Monitor and reflect on the process of mathematical problem solving

Calculus Scope and Sequence: Applications of Derivatives
Keywords: max,min, absolute max, maximum,minimum
Description: This activity will involve finding the absolute extrema on a closed interval of a function.

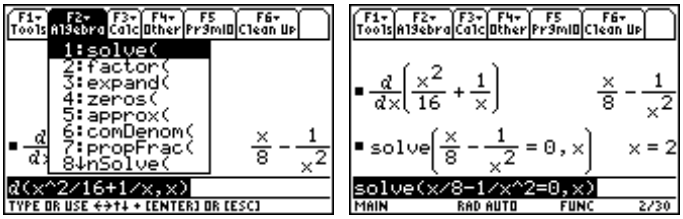
Find the absolute maximum and minimum of $f(x)=\frac{x^2}{16}+\frac{1}{x}$ *on [1,4]*

- First, find the derivative
- Next, set the derivative equal to zero, to find possible points
- Evaluate the function at the points found and also at the endpoints
- Confirm graphically

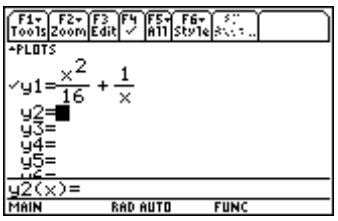
To find the derivative go to F3-Calc-#1
Then use the following syntax: *d*(function, variable)



To solve go to F2-Algebra-#1
Use the following syntax: solve(function=value,variable)
User tip: You can copy the previous answer into the solve function by using the up-arrow to highlight it and press ENTER

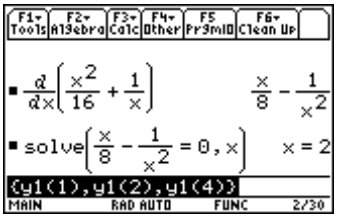


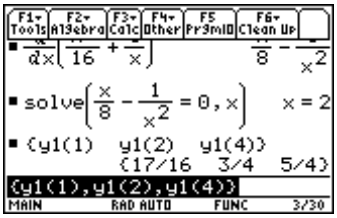
To make evaluating easy, store the function in y1:



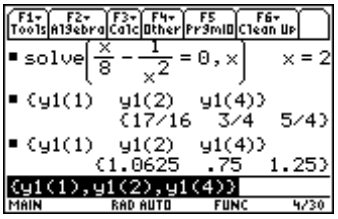
Now, back on the homescreen, evaluate the function at the endpoints and the value found above.

User tip: You can "tabularize" your results by doing the evaluating as a list. To create that list use the following syntax: {1st, 2nd, 3rd,…}





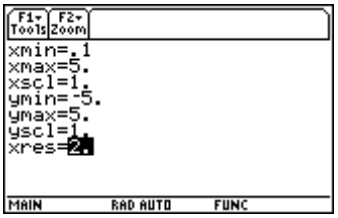
You can have it do the decimal equivalent by pressing <Diamond> then ENTER

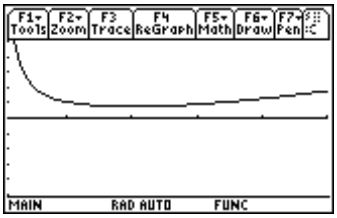


Thus the absolute max is at 4, with a value of 1.25, and the absolute min is at 2 with a value of .75

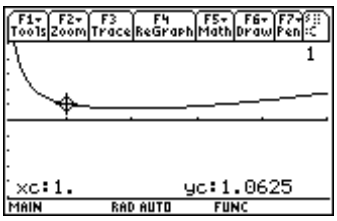
You can confirm you results graphically:

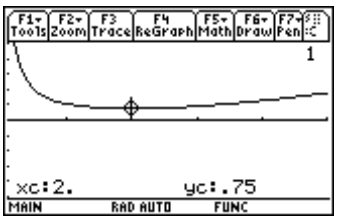
Use a window that captures your interval and leaves a little room for observation:

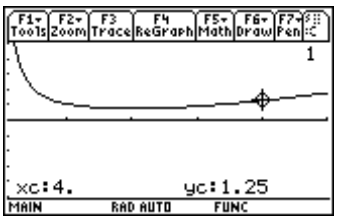




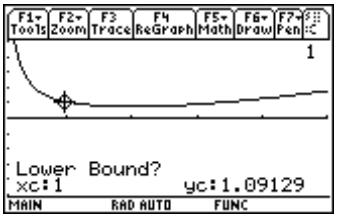
Using F5-Math-#1 you can see where each of these values is:

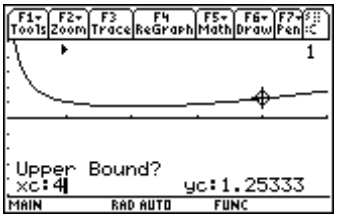


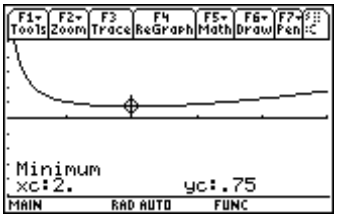




You can also use the MINIMUM found in the same F5-Math key to calculate the extrema:







Use tip: When using the Minimum (or maximum) it is easier to type in the value you want to use as a boundary when asked, than to try to trace to it, as the trace is subject to the window you have created.