

Calculus Group Worksheet - Maxima and Minima

To find the global max and min of $f(x)$ on a closed interval $[a, b]$

1. Take $f'(x)$
2. Set $f'(x) = 0$
3. Solve for x
- What are these points called?
- Why are we interested in them?
4. List only those numbers that lie in $[a, b]$
5. Plug these numbers into $f(x)$
6. Plug the endpoints into $f(x)$
7. Compare the values from steps 5 and 6
8. The largest value is the global max

The smallest value is the minimum value of $f(x)$

We say: The global max of $f(x)$ is at $x =$ _____
and has maximum value $f(x) =$ _____
Likewise for global min.

Ex:

To find the local max and min of $f(x)$:

1. Take $f'(x)$
2. Set $f'(x) = 0$
3. Solve for x
4. Find all places where $f'(x)$ does not exist
5. Make a sign chart, listing all numbers found in steps 3 and 4
6. Determine the sign of $f'(x)$ on each of the intervals created in step 5
7. List all places where $f'(x)$ changes sign
8. Plug those numbers into $f(x)$ to verify that these numbers are in the domain of $f(x)$; discard those that are not
9. Use the sign chart to determine which of these points are local maxima and which are local minima

We say: $f(x)$ has local maxima at $x =$ _____
 $f(x)$ has local minima at $x =$ _____

Ex: