Lab 3: Review of absolute and local maximums and minimums

Names:

Goal

Review concepts related to absolute and local maximums and minimums.

Directions

In groups of 2–4, answer each of the following questions in the space provided. You only need to turn in one lab per group (make sure you put everyone's name on this sheet). The lab is due on **Friday, 11.13** and is worth 10 points.

Exercises

1. What does it mean for a function f to have a local max/min at $x = c$?

2. Provide an example of a function that has 2 local maximums and 1 local minimum. (A graph of a function is sufficient. You do *not* need to find an equation.)

3. What does it mean for a function f to have an absolute max/min at $x = c$ on all of $(-\infty, \infty)$?

4. Provide an example of a function that is continuous on $(-\infty, \infty)$ and has an absolute maximum, but does not have an absolute minimum. (A graph of a function is sufficient. You do *not* need to find an equation.)

5. What does it mean for a function f to have an absolute max/min at $x = c$ on the closed interval $[a, b]$?

6. What types of functions always have an absolute max/min on a closed interval? What theorem tells us this?

7. Provide an example of a continuous function on the interval $[0, 1]$ such that f has an absolute maximum at a point in $(0, 1)$ and an absolute minimum at $x = 1$. (A graph of a function is sufficient. You do *not* need to find an equation.)

8. What does it mean for $x = c$ to be a critical number of a function f?

9. How do you find critical numbers?

10. What relationship is there between critical numbers and local maximums/minimums? (Be careful: one implies the other, but not the other way around.)

11. Provide an example of a function that has a critical number at some $x = c$ but does not have a local max/min at $x = c$. (A graph of a function is sufficient, but you can also provide an equation of a function if you know of one that has the desired properties.)

12. Given a continuous function f on the closed interval $[a, b]$, where can the absolute max/min of f occur? (Be as specific as possible.)

13. What are the steps for finding absolute maximums/minimums on a closed interval?