

WEEKLY 10
APPLIED CALCULUS
DUE 10-29

Show your work!

- (1) Consider the function $f(x) = \frac{x}{\sqrt{x-4}}$.
- (a) Find the absolute maximum and absolute minimum of $f(x)$ on $[6, 12]$.
 - (b) How does your answer change if you look for the absolute extrema on $(4, \infty)$?
- (2) For each of the following statements, indicate whether it is true or false. Justify your answers. You may find it helpful to draw pictures.
- (a) If $f'(3) = 0$, then $x = 3$ is a local maximum of $f(x)$.
 - (b) The height of any local minimum of $f(x)$ is smaller than the height of any local maximum of $f(x)$.
 - (c) If $x = 5$ is the only critical point of $f(x)$ on $[1, 7]$, and $x = 5$ is a local minimum of $f(x)$, then $x = 5$ is an absolute minimum of $f(x)$ on $[1, 7]$.
 - (d) If $x = 3$ and $x = 5$ are the only critical points of $f(x)$ on $[1, 7]$, and $x = 3$ is a local maximum and $x = 5$ is a local minimum of $f(x)$, then $x = 5$ is an absolute minimum of $f(x)$ on $[1, 7]$.
- (3) A *Norman window* is a window in the shape of a rectangle with a semicircle on top. What is the area of the largest Norman window with a perimeter of 16 ft? Be sure to identify the domain, and justify why your answer is a maximum or minimum.

- **One** book problem: #12.3.34.

- **This problem *only* to be submitted individually.** It must be completed on a separate, new sheet of paper, not on the original exam.

Re-do any **one** regular problem (#1–#5) on Midterm 2. Your grade on this one problem will replace the original grade. For example, if you earned 5/10 on #2 and submit a complete, correct solution, then your recorded midterm grade will increase by 5 points.

These problems will be graded quite strictly, so be sure that your answer is absolutely correct! You may talk to anyone, including your classmates and the instructor, about your solution, but you **must** write it up yourself.