Local extrema

UNIVERSITY OF TORONTO

November 19th, 2018

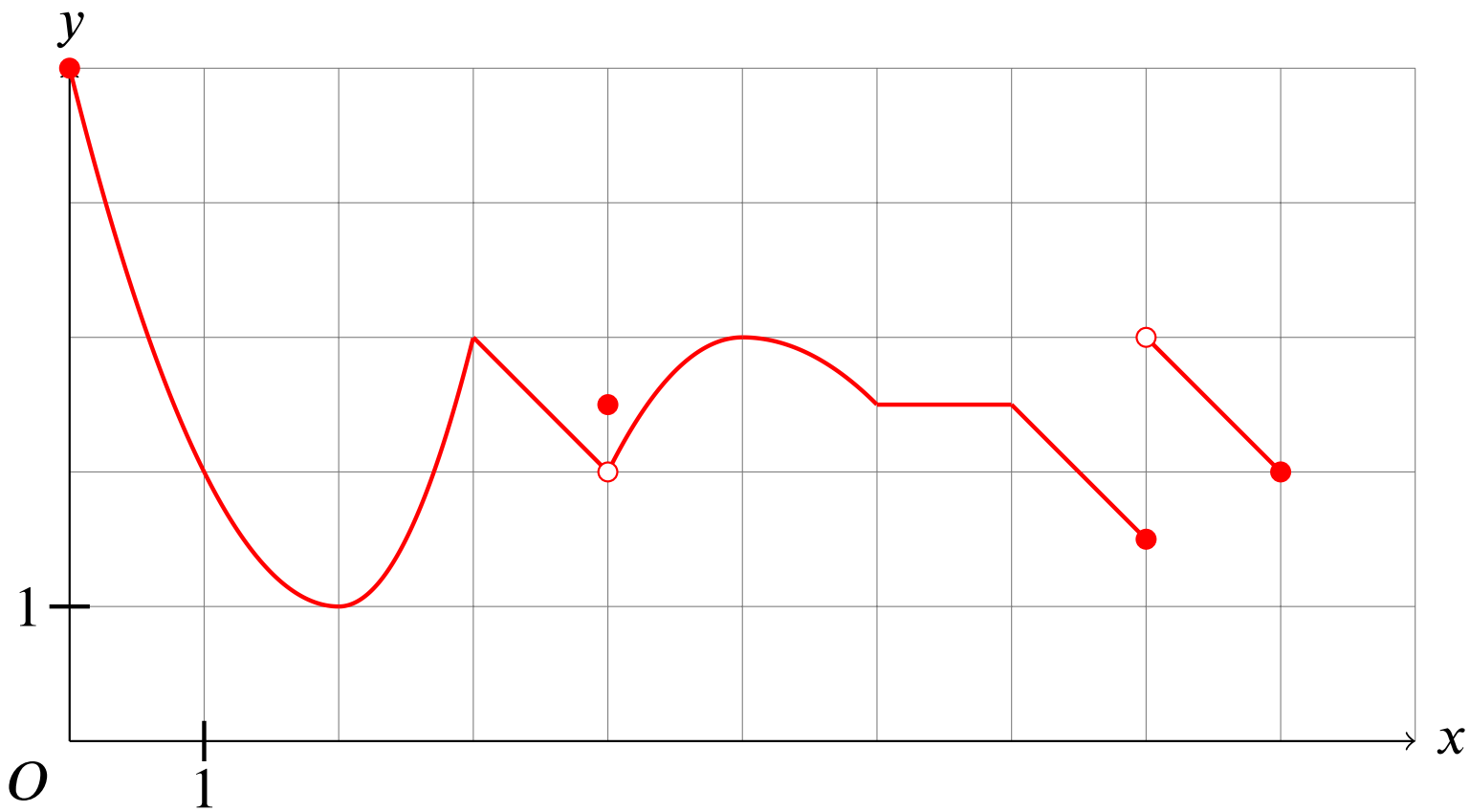
For next lecture

For Wednesday (Nov 21), watch the videos:

- Rolle's Theorem: 5.5, 5.6
- The MVT: 5.7, 5.8, 5.9

Extrema

Find the local and global extrema of the function whose graph is given below:



Trig extrema

Let $f(x) = \dfrac{\sin x}{\sqrt{2} + \cos x}$.

Find the maximum and minimum of f.

A sneaky function

Construct a function f satisfying all the following properties:

- The domain of f is $\mathbb{R}$,
- f is continuous,
- $f'(0) = 0$,
- f does not have a local extremum at 0,
- there is no interval centered at 0 on which f is increasing,
- there is no interval centered at 0 on which f is decreasing.

Additional comments after the class

1. We spent a lot of times on Slide 4. There are several subtleties and we can't avoid some steps (at least at this level of the course). You should be sure that you understand the reason of each of these steps! Otherwise, ask me or go to any office hour!

2. Concerning Slide 5: the exact answer isn't important here. However, be sure you understand the process we used to construct it: why did we start with that function? how did the different conditions make us change our original function until obtaining a suitable answer?