Algebra quiz ~~Wed 16 December~~

Fake News

In the old days

1972 Richard Nixon:

The rate of increase in inflation is decreasing

The "only" use of the third derivative in politics.

Lecture 27: derivative & rates of change

Lecture 28: derivative & maximum problem

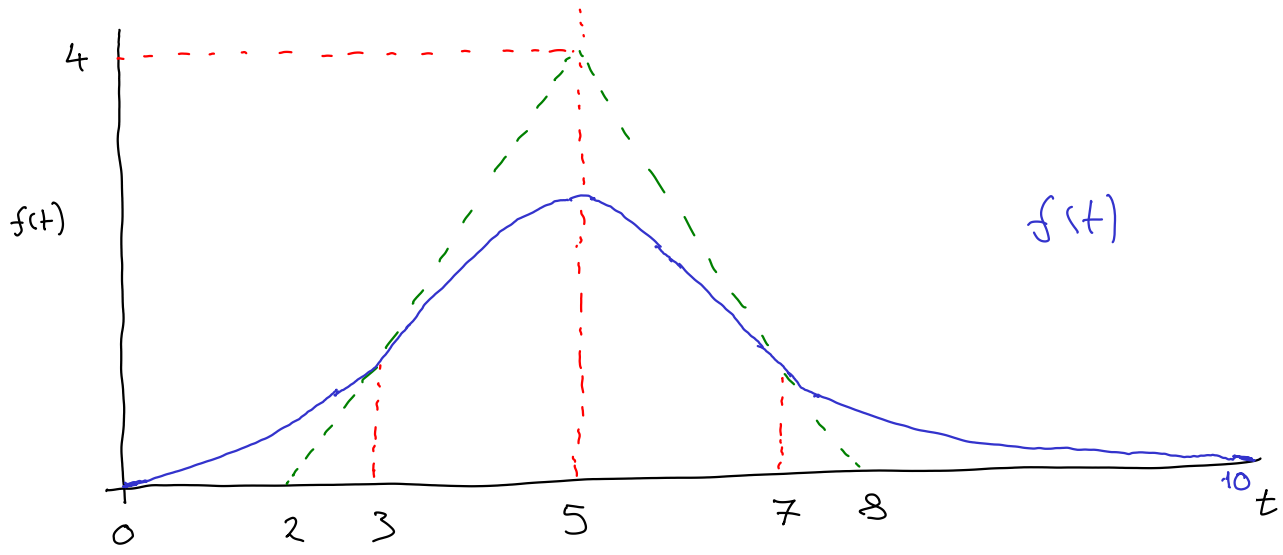
Today: derivatives & curve sketching

Understanding graphs of functions

A car drives on a long straight track.

At time t its distance from the start is $f(t)$.

The graph of $f(t)$ is:



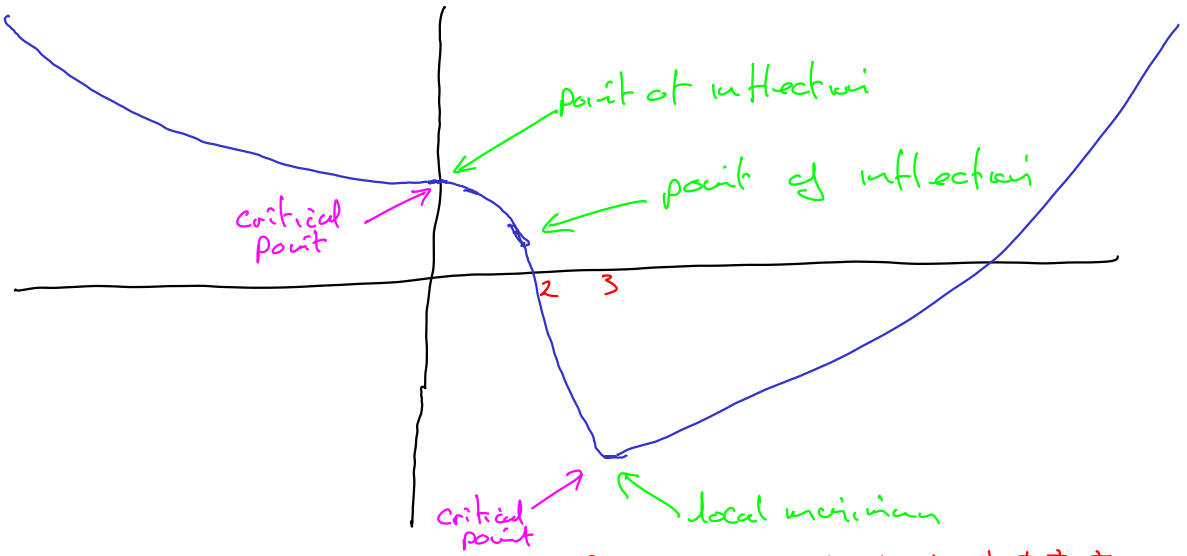
Determine when:

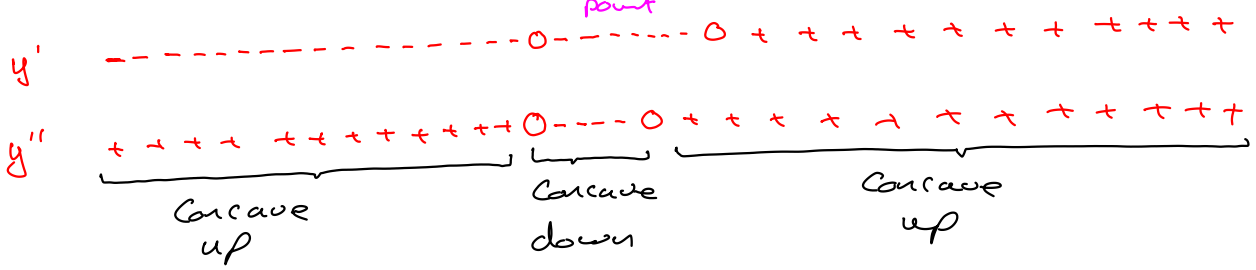
1) speed is positive. $(0, 5)$
2) speed is negative. $(5, 10)$
3) car is accelerating. $(0, 3) \cup (7, 10)$
4) car is decelerating. $(3, 7)$
5) what is the fastest speed between $t = 0$ and $t = 5$? $\frac{4}{3}$

Example Sketch the graph of $y = x^4 - 4x^3 + 10$.

Soln $y' = 4x^3 - 12x^2 = 4x^2(x-3)$

$y'' = \frac{d}{dx}(y') = 12x^2 - 24x = 12x(x-2)$





Defn If $f''(x) < 0$ on an interval then f is concave down.

If $f''(x) > 0$ on an interval then f is concave up.

Defn If $f'(x) = 0$ or if $f'(x)$ does not exist (and x is domain of f) then we have a critical point at x.

Defn The concavity changes at a point of inflection