

Fake News : New, in the old days

1972 Richard Nixon:

The rate of increase in inflation is decreasing.

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

Last Monday: rates of change applications

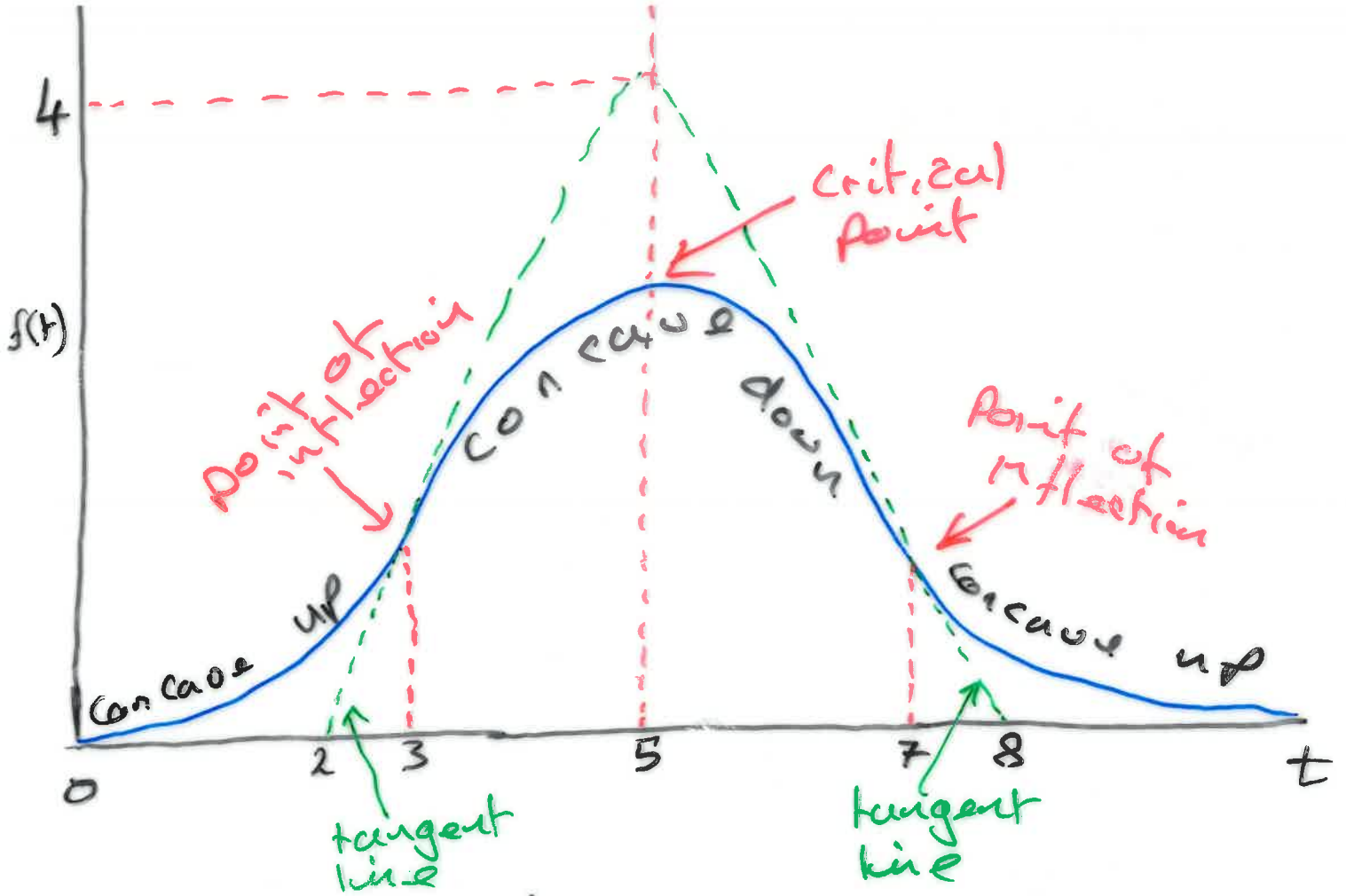
Last Tuesday: derivatives & max/min applications

Today: derivatives & curves.

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:

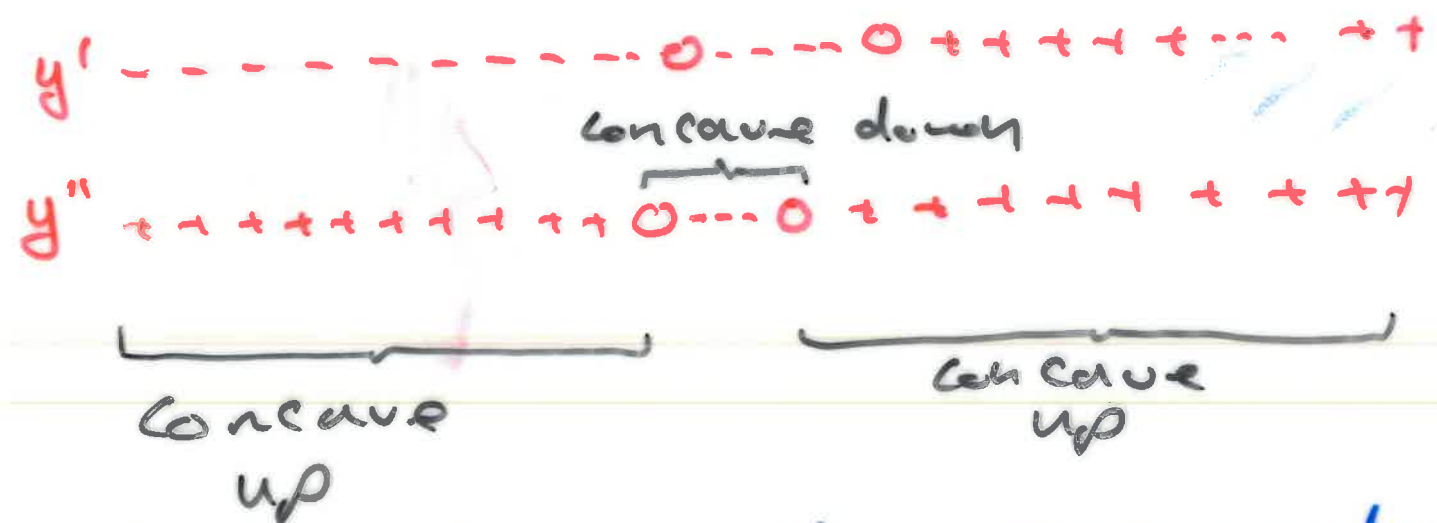
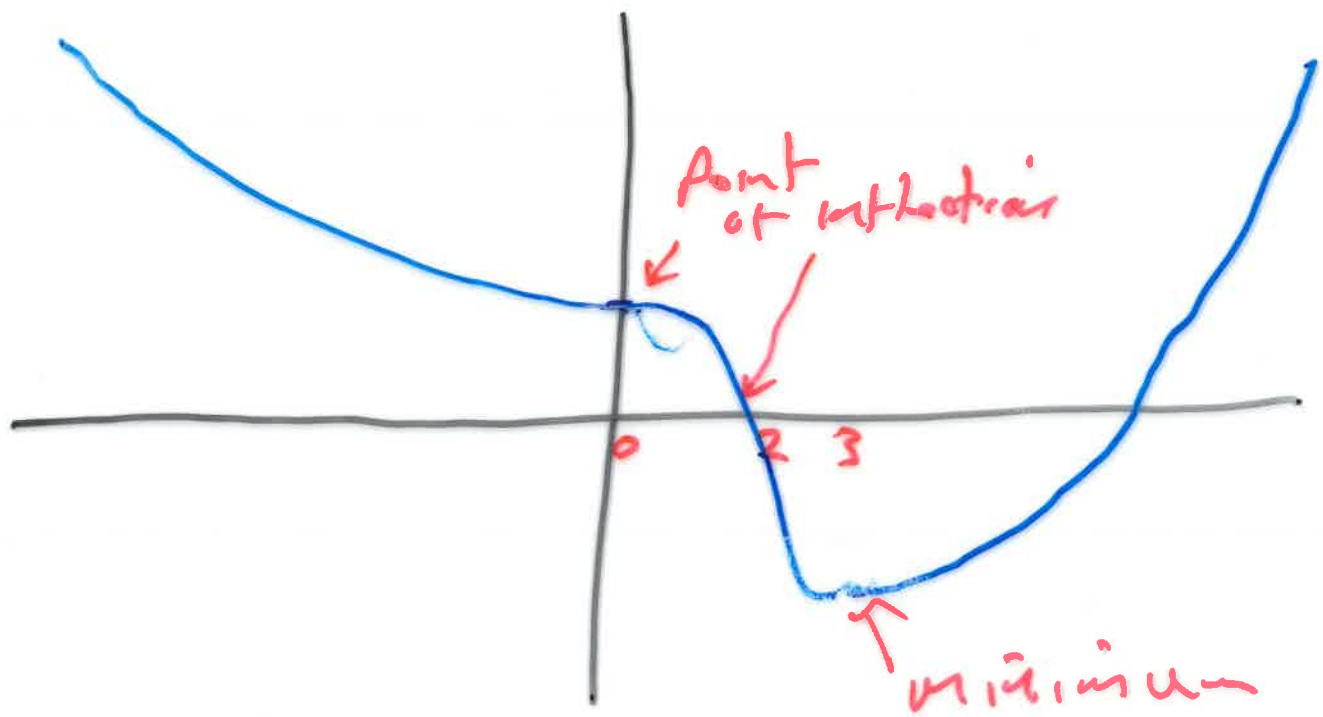
- 1) speed is positive. Ans $(0, 5)$
- 2) speed is negative. Ans $(5, 10)$
- 3) car is accelerating. Ans $(0, 3) \cup (7, 10)$
- 4) car is decelerating. Ans $(3, 7)$.
- 5) what is the fastest speed between $t=0$ and $t=5$. Ans $\frac{4}{3}$.

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 $f''(x) < 0$ then concave down.
 If $f''(x) > 0$ then concave up.
 The concavity changes at a point of inflection,

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