

## HW 3 (Quiz in week 4)

1. Let  $f(t)$  be real-analytic at  $g(t_0)$  and  $g(t)$  at  $t_0$ . Then prove that  $h(t) = f(g(t))$  is real-analytic at  $t_0$ .
2. If a real-valued function  $f$  defined in a neighbourhood of  $t_0$  is analytic at  $t_0$ , then prove that
  - (a)  $f$  is smooth in a neighbourhood of  $t_0$ , and
  - (b) there exist positive  $\delta, M$  such that for  $t \in (t_0 - \delta, t_0 + \delta)$ ,  $|f^{(k)}(t)| \leq M \frac{k!}{\delta^k}$  for  $k = 0, 1, 2, \dots$