

Assignment #9, notes and hints

Problem 10.6.4 Following the method sketched in section 10.6.1 (and in class) find the first three nonzero terms of the power series expansion of $\tan x$.

Problem 10.7.3 Find the terms of the power series expansion of $e^{\tan x}$ at $x = 0$ through the term involving x^4 .

Problem 11.1.5 : Hint : You may use without proof the following variant of Problem 5.4.3 (which was assigned last semester, and essentially the same proof works): *If $c \in [-1, 1]$ and if we define*

$$H_c(x) := \begin{cases} \sin(x^{-1}) & \text{if } x \neq 0 \\ c & \text{if } x = 0 \end{cases} ,$$

then H_c has intermediate value property in \mathbb{R} .

Problem 11.1.6 Part (a) was (mostly) shown in class, as was the following : *If $f \in C[0, 2\pi]$, then $f \cdot f \geq 0$ with equality if and only if $f \equiv 0$.*

Problem 11.2.6 Part (a) is very easy. For the second inequality in part (c) one possible trick is to apply creatively the Cauchy-Schwarz inequality.