Turn in your solutions in class on Thursday 27/2/2020. Write briefly without ommitting the essentials.

1. (i) If $a_n, b_n, n = 1, 2, \ldots, N$ are complex numbers and $B_k = \sum_{n=1}^{k} b_n$ show the very useful formula of summation by parts (which is the analogue of intergration by parts for sums)

$$\sum_{n=M}^{N} a_n b_n = a_N B_N - a_M B_{M-1} - \sum_{n=M}^{N-1} (a_{n+1} - a_n) B_n.$$

(ii) If $a_n \to 0$ is a decreasing sequence and the partial sums of the series $\sum_n b_n$ are bounded then the series $\sum_n a_n b_n$ converges.

2. If $0 < \delta < \pi$ compute the Fourier coefficients of the function $f : [-\pi, \pi] \to \mathbb{R}$ given by the formula

$$f(x) = \begin{cases} 1 - \frac{|x|}{\delta} & (|x| \leq \delta) \\ 0 & (\delta \leq |x| \leq \pi). \end{cases}$$