

Math 250b (Spring '08) - Homework 4

1. The n th order Taylor polynomial of e^x about 0 is

$$1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \cdots + \frac{x^n}{n!} \quad (1)$$

(a) Find the n th order Taylor polynomials of e^{ix} and e^{-ix} about 0.

(b) Recall that

$$\cos(x) = \frac{e^{ix} + e^{-ix}}{2}, \quad \sin(x) = \frac{e^{ix} - e^{-ix}}{2i} \quad (2)$$

Use these formulas and your answers to (a) to find the n th order Taylor polynomials of $\cos(x)$ and $\sin(x)$ about 0. (Of course, you should get the same answer we got before.)