## Mathematics 623 – Complex Analysis Fall 2014Third assignment

A. (i) For all complex numbers  $u \neq 0$  with  $|\text{Im}(u)| \leq \text{Re}(u)$  prove

$$\int_0^\infty e^{-u^2 x^2} dx = (2u)^{-1} \sqrt{\pi} \, .$$

Argue first that these integrals converge as improper integrals. (ii) Compute  $\int_0^\infty \cos(x^2) dx$ ,  $\int_0^\infty \sin(x^2) dx$ .

B. Do Exercises No 6.2, and 6.3 on page 64 in the textbook.