Exercises for seminar week 43

The following exercises in Rice chapter 5 (both editions 2 and 3):

1, 4, 6

(**Hint for 6**: Use the same method as for the poisson example in the lecture or example 4 in "lecture notes to Rice chapter 5". Note also that $\alpha \to \infty$ implies that $x = 1/\sqrt{\alpha} \to 0$. Then use l'Hôpital.)

12, 13, 15

Finally take no. 30 in edition 3. This exercise is not in edition 2, so we copy it here:

Ex. 5-30:
Generate a sequence $U_1, U_2, \ldots, U_{1000}$ of independent uniform (over [0,1]) r.v.'s on a computer [e.g., STATA; note page 9 in the tutorial. Explore the sum function by the command, `help sum`]. . Let $S_n = \sum_{i=1}^{n} U_i$ for $n = 1, 2, \ldots, 1000$. Plot each of the following versus *n*:

a. S_n
b. S_n / n
c. $S_n - n/2$
d. $(S_n - n/2)/n$
e. $(S_n - n/2)/\sqrt{n}$

Explain the shapes of the resulting graphs using the concepts of this chapter (chap. 5).