DUE: TUESDAY JANUARY 18, 2011

Due to Martin Luther King, Jr. Day on Monday January 17, 2011, my Monday office hours will be held on Friday January 14 from 2–4 pm. The Monday discussion section will be held on Tuesday January 18 from 5:30–7:00 pm in ISB 231 (note the room change). Completed homeworks may be handed in one day late without penalty as long as they are deposited in my physics department mailbox no later than 5 pm on Wednesday January 19.

To receive full credit, you must exhibit the intermediate steps that lead you to your final results.

1. Boas, p. 29, problem 1.13–4.

2. Boas, p. 32, problem 1.13–13. The computer analysis is optional.

3. Boas, p. 36, problem 1.14–6.

4. Boas, p. 40, problem 1.15–2. Compare your results with a calculation performed either with a computer (e.g. Mathematica) or a calculator.

5. Boas, p. 41, problem 1.15–9.

6. Boas, p. 41, problem 1.15–18.

7. Boas, p. 41, problem 1.15–23 (b) and (d). The computer comparison is optional. In addition, find the *behavior* of the given functions as $x \to 0$. Although Boas suggests that you should first combine the fractions, this hint is less useful for determining the behavior as $x \to 0$.

8. Boas, p. 45, problem 1.16–23.

9. The function $E_1(x)$ is defined by

$$E_1(x) \equiv \int_1^\infty \frac{e^{-xt}}{t}\, dt\,.$$

Find the asymptotic series for $E_1(x)$ as $x \to \infty$.

HINT: Use the integration by parts method discussed in class. For a similar example, see Chapter 11, Section 10 of Boas. This problem is equivalent to problem 10.10–5 (b) of Boas, p. 552.

10. Boas, p. 51, problem 2.4–4

11. Boas, p. 52, problem 2.5–7

12. Boas, p. 53, problem 2.5–27

13. Boas, p. 54, problem 2.5–47.