

## Homework 7

Due: Wed. Mar. 16, 2005

**Section 15.7**, pg. 997: 39, 41, 43, 44, 54.

**Section 15.8**, pg. 1007: 27, 29, 31, 39, 43.

**Section 16.1**, pg. 1025: 11, 12, 18.

**Section 16.2**, pg. 1030: 11, 12, 13, 15, 36.

**Additional Problem:**

1. Experimental data is collected in the form  $(t_1, y_1), (t_2, y_2), \dots, (t_n, y_n)$ . When the data is plotted, it appears to fit the graph of an exponential function of the form  $y = Ae^{\alpha t}$ .

- (a) Write the  $n$  equations that you would need to solve to find the values of  $A$  and  $\alpha$ . [Hint: those equations are not exactly of the form  $y_i = Ae^{\alpha t_i}$ ]
- (b) **Derive** the **two** equations that you would need to solve to determine the values of  $A$  and  $\alpha$  that minimize the *least squares* error:  $\sum_1^n d_i^2$ , where  $d_i = \ln y_i - \ln A - \alpha t_i$ .