Homework 6 **MATH-1400-ES31** **2012 April 17**

Practice Problems

These problems are not to be handed in, but try them first; also try the even problems if you need more practice.

- From §3-7 (pages 200–203): 1–19 odd, 31, 35, 37;
- From §4-6 (pages 254&255): 1, 3, 5, 9, 17, 21, 25, 29, 31.

The answers to these should be in the back of your textbook.

Due Problems

These problems are due April 19 Thursday.

1 Suppose that research for a small automobile company suggests that the annual revenue from selling x cars per year will be $25\,000\,x - 5x^2$ dollars, while the annual cost of producing x cars per year will be $10\,000 + 5000\,x$ dollars. Suppose that the company made and sold 2000 cars last year.

a. What was the company's marginal revenue last year? (Show at least what numerical calculation you make, as well as your final answer in words.)

b. What was the company's marginal cost last year? (Show at least what numerical calculation you make, as well as your final answer in words.)

c. What was the company's marginal profit last year? (Show at least what numerical calculation you make, as well as your final answer in words.)

2 A patient is given an injection of medication. Suppose that, t hours after the injection, the amount of medication (in cubic centimetres) in the bloodstream of the patient is $\dfrac{100}{t^2+1}$.

a. How fast is the medication leaving the bloodstream after 1 hour? (Show at least what numerical calculation you make, as well as your final answer in words.)

b. As the medication leaves the bloodstream, it enters the patient's cells. Theoretically, if there is $x\,\mathrm{cm}^3$ of medication left in the patient's bloodstream and the medication has entered y billion cells, then $x + 2y = 100$. If this theory is accurate, then how fast is the medication entering the patient's cells after 1 hour? (Show at least what numerical calculation you make, as well as your final answer in words.)