LAS Calculus
The beginning of the Calculus
Homework 3

1. Prove that if n is an integer greater than 2, then

   $$x^n + y^n = z^n$$

   has no solution for x, y and z positive integers.

2. (a) Use Fermat's method to divide 4 into two parts so that their product is a maximum.

   (b) Do the same for 20.

3. Why is 1666 called the *Annus Mirabilis*?

4. What are Newton's three laws of motion?

5. Use Newton's method to find the connection between $\dot{x}$ and $\dot{y}$ given that $y = 3x^2$.

6. Show, in the manner of Leibniz, that if $y = 2x^2 + x$, then

   $$dy = (4x + 1)dx.$$

7. Show, in the manner of Leibniz, that if $dy/dx = z$ (where y and z are functions of x), then $y = \int z dx$. Explain what this means.