

MAPLE PROJECT 4  
Applications of the Integral  
Due date April 30, 2007

**Problem 1. Area:** Find the area of the region in the first quadrant that lies below the curve

$$y = x + x^2 - x^3$$

and above the x-axis.

**Problem 2. Area:** Find a positive value of  $k$  such that the region in the first quadrant enclosed by  $y = x^2$ ,  $y = x^2/4$ , and the horizontal lines  $y = k$  and  $y = k + 1$  has an area of 3 square units.

**Problem 3.** Consider the function  $f(x) = x^3 - 2x^2 - 3x + 10$  on the interval  $[-2, 3]$ .

- (a) Calculate numerically the left, and right sums for  $n=10$  and  $n=100$ .
- (b) Find the limit of the left sum as  $n \rightarrow \infty$ . Compare the area as found using “int” command.
- (c) Plot the graph of  $f$  and rectangles for its left and right sums for  $n=20$  (in one graph)