Section Summary: 5.1

1. Definitions/Theorems

The area A of the region bounded by the curves $y = f(x)$, $y = g(x)$, and the lines $x = a$ and $x = b$, where f and g are continuous and $f(x) \geq g(x)$ for all x in $[a, b]$, is

$$A = \int_a^b [f(x) - g(x)]dx$$

The area A between the curves $y = f(x)$, $y = g(x)$, and the lines $x = a$ and $x = b$ is

$$A = \int_a^b |f(x) - g(x)|dx$$

2. Properties/Tricks/Hints/Etc.

It's sometimes necessary to find the area A between the curves $x = f(y)$, $x = g(y)$, and the lines $y = c$ and $y = d$, with $f(y) \geq g(y)$: this is

$$A = \int_c^d [f(y) - g(y)]dy$$

No great shakes, here: just switch the roles of x and y in the equations, and you can do them using the "x" formulas; but it's a minor convenience to be flexible enough to skip the step, and go directly to integrating along the y axis.

3. Summary

There's nothing particularly remarkable in this section: it simply generalizes the problem of finding areas between the graph and the x-axis to the problem of finding areas between graphs of two functions. Since the x-axis is the graph of the function zero, this is simply a generalization.