Section 6.1 Worksheet:

Assigned problems: Exercises pp. 306-308, #1, 2, 11-14, 17, 18, 22, 44, 52.

1. An integral doesn't really represent an area, as the Greeks understood area, because an integral can be negative (and area can't). So we consider integrals as sums of positive and "negative" areas. If you actually want the physical, Greek-style area between two curves, you have to keep your differences positive: what standard function helps us do that?

2. There is nothing special about integrating along the x-axis – we could just as easily integrate along the y-axis. The areas won't change. What may change is the difficult of evaluating the result. Draw two examples, one where integration along the x-axis is better, one where integrating along the y-axis would be better.

3. One twist in this section is that we sometimes have functions of y, rather than x. Draw an example, and explain how you would proceed differently (if at all!).

Notes:

1. This section is a simple generalization of the definition of a definite integral as a sum of positive and negative areas bounded by

   - the graph of a function,
   - the x-axis,
   - and two vertical lines at $x = a$ and $x = b$.

   Now we simply consider areas bounded by

   - the graph of a function,
   - the graph of a second function,
   - and two vertical lines at $x = a$ and $x = b$.

The consequence is simply that we need to do the difference of two integrals, rather than a single integral. Twice the work, with scarcely any additional complexity. One twist is integration along the y-axis: big deal! Nothing special about x... although it seems like it sometimes!

2. This section illustrates the importance of equations of the form $f(x) = g(x)$ – that is, $h(x) = f(x) - g(x) = 0$. Root-finding! Don't forget Newton....