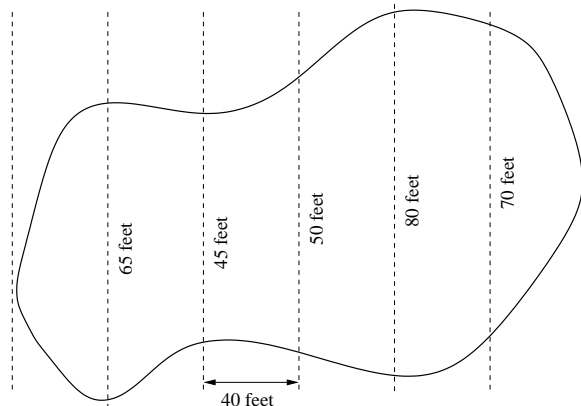In this work sheet we'll study the problem of finding the area of a region bounded by curves. We'll first estimate an area given numerical information. The we'll use calculus to find the area of a more complicated region.
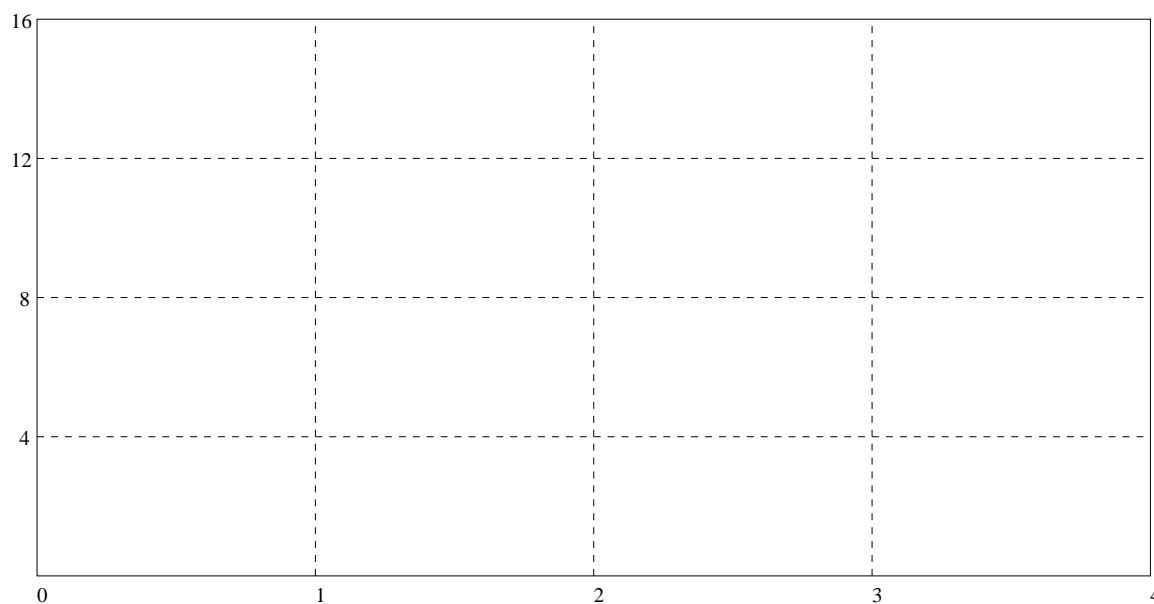
The Lake

1   The widths, in feet, of a small lake were measured at 40 foot intervals. Estimate the area of the lake.

Area Bounded by Three Curves

2   On the grid below sketch the graphs of $y = 4$, $y = x^2$ and $y = \sqrt{27x}$. (The last one is just a piece of a sideways parabola).

3   Shade the "triangular" region bounded by the graphs of the three functions that lies above the horizontal line.

4   Compute the x-coordinate of the left endpoint of the region.

5   Compute the x-coordinate of the right endpoint of the region.

6   Note that the top of the region consists of a single curve, but the bottom of the region consists of two different curves. Find the x-coordinate where these two curves meet.

7   Sketch in a vertical line at the x-coordinate you found in the last problem. This divides the region into two smaller sub-regions.

8   Compute the area of the left sub-region.

9   Compute the area of the right sub-region. Add the two areas together to get the total area.

10   Recompute the area using the following trick. Solve for x as a function of y in the two non-constant functions. Find the area by integrating with respect to y. Is this easier?