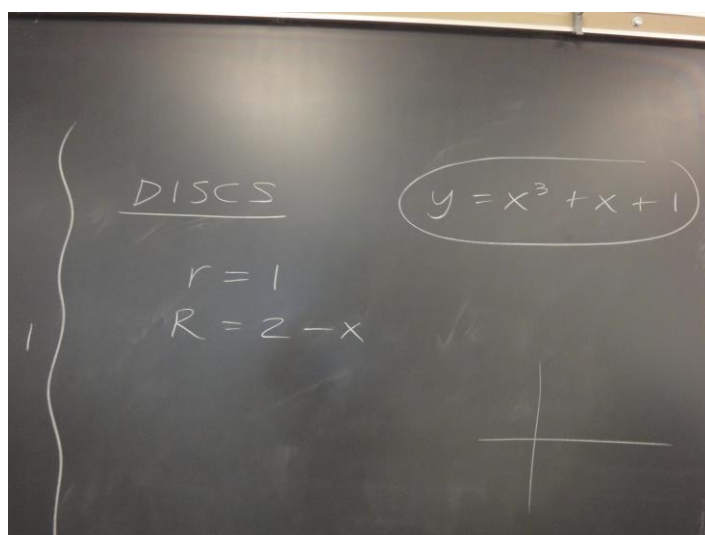
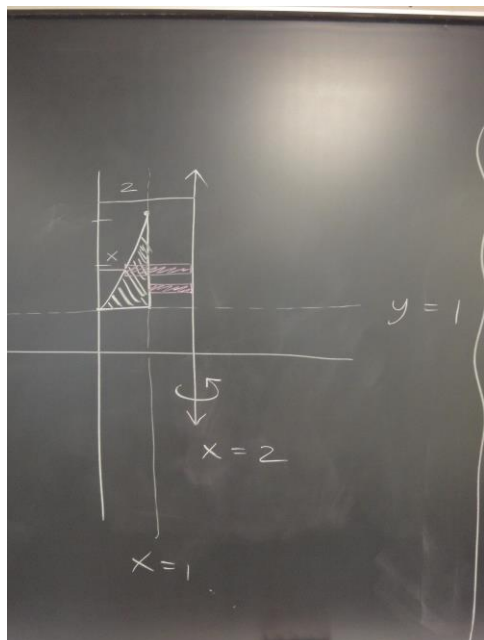


Shell Method

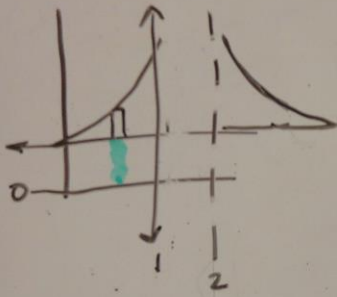
EXAMPLE

Consider the region R bounded by the curves $y = x^3 + x + 1$, $y = 1$, and $x = 1$. Set up the integral that gives the volume of the solid formed by revolving R about the line $x = 2$. Make sure you sketch the region R before you begin.
Try discs first and then try shells.

(1) The disc method starts out fine until we have to express x in terms of y :



Wolfram Alpha can do this (as we saw in class) but this is reason enough to examine the Shell Method and see what we get there. See the set-up on the following page:



Shell Method

$$h(x) = x^3 + x + 1 - 1$$

$$r(x) = 2 - x$$

$$\text{Vol} = 2\pi \int_0^1 (x^3 + x)(2 - x) dx$$

