Review 33. What is the area enclosed by the curves $y=2-x^2$, $y=-x$?

Example 34. What is the area enclosed by the curves $y=3-x^2$, $y=2$, $y=-1$?

Volumes

Please have a look at the Section 6.1 in the book for all the pretty pictures and detailed explanations. Below is just a summary which probably doesn't make too much sense unless you have been in class or have read through the beginning of Section 6.1.

- The volume of a cylindrical solid is its base area times its height.
- The idea for computing the volume of more general solids is to cut it into little slices that are approximately cylindrical.
- Suppose that the slice at position x has cross-sectional area $A(x)$. If we are slicing with a width of $\mathrm{d}x$, then this slice has roughly volume $A(x)\mathrm{d}x$.
- Summing the volumes of all these slices leads to the follwing formula of the volume of the general solid:

$$\mathrm{vol}=\int_a^b A(x)\mathrm{d}x$$

Note: It is usually up to us to introduce coordinates for the position x. The formula above assumes that our solid extends from $x=a$ to $x=b$ in these coordinates.

Example 35. Derive the formula for the volume of a pyramid of height h whose base is a square with sides of length a.

You might remember that the volume is $\frac{1}{3}a^2h$ but the point of this example is that we can actually find this formula without knowing it by slicing the pyramid (the easiest way to slice is horizontally, so that each cross-section is again just a square).

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