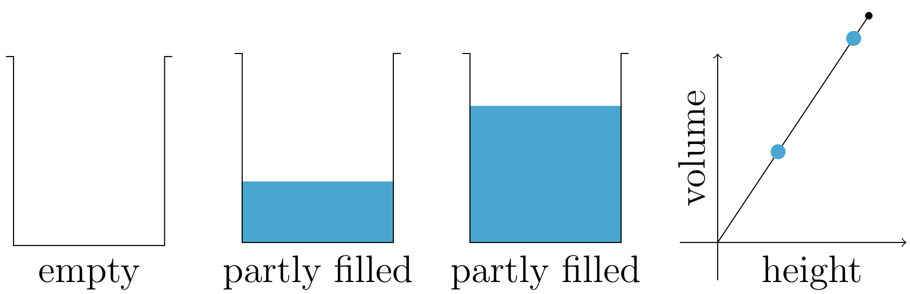
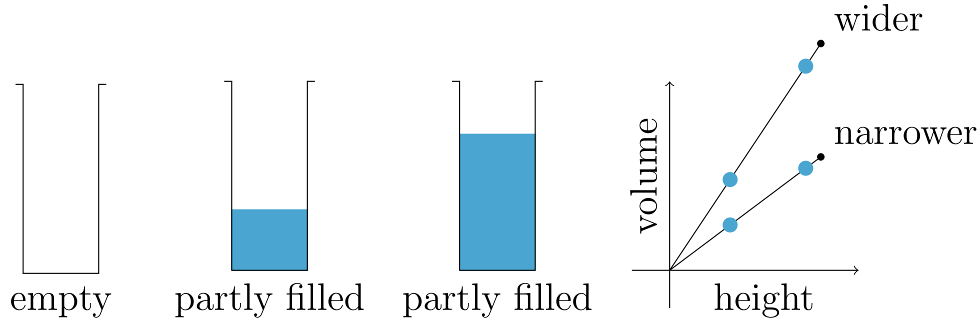
For the syllabus, please see our course website:
https://mark-sing.com/math50fall22/

Today we introduced **calibration functions** for bottles/beakers. These graphs tell you the total volume in a container when it is filled to a certain height. In other words, they are a **function** from heights to volumes.

For example, consider a simple beaker, filled up to two different heights. We can plot the three different heights and volumes on a graph, and it looks like the calibration function will be a line. The dot "capping" the line is a reminder that the calibration function is only defined up until the bottle is completely full:



Now, suppose that we repeated this with a narrower bottle, half the width, but using the same heights. The smaller bottle will have a smaller volume at the same heights, so we end up with a shallower line, half as steep:



What about a bottle whose width isn't constant? Width corresponds to steepness, this means that the the steepness of the calibration function isn't constant – it is a curve. For lots of examples, see the worksheet and its solutions. Given some bottle, the width at a given height tells you how quickly the calibration function is growing near that height. This is an instance of the *first definition* of calculus from the syllabus: it is the the study of functions in terms of their growth. Later, we will revisit calibration functions in detail to make the connection precise.