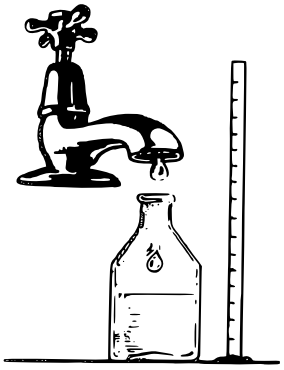
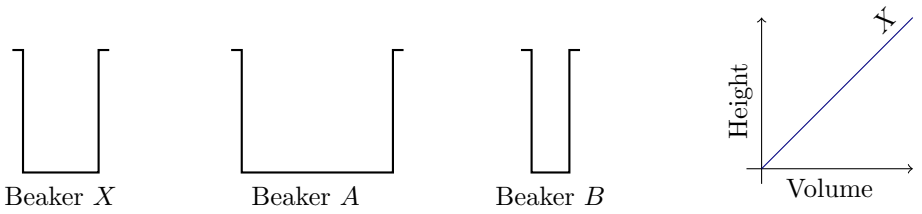


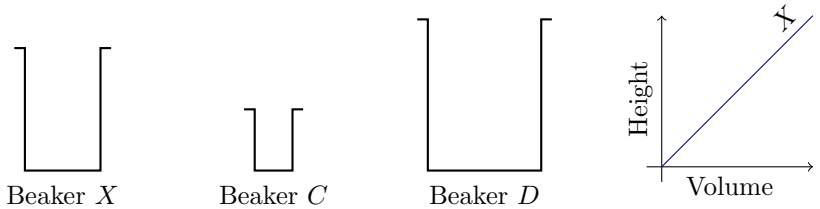
Filling Bottles

In order to calibrate a bottle so that it may be used to measure liquids, it is necessary to know how the height of the liquid depends on the volume in the bottle.

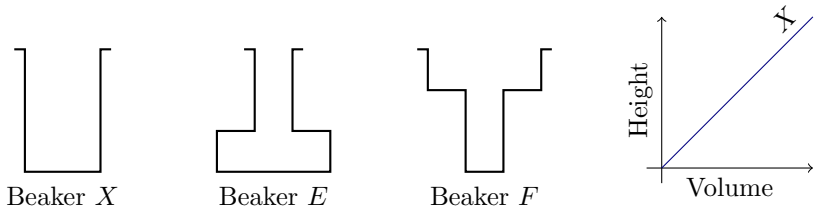
1. The graph below shows how the height of the liquid in beaker X varies as water is steadily dripped into it. On the same diagram, show the height-volume relationship for beakers A and B.



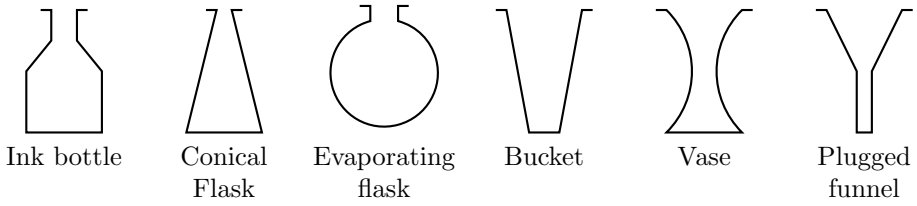
2. Sketch two more for C and D:



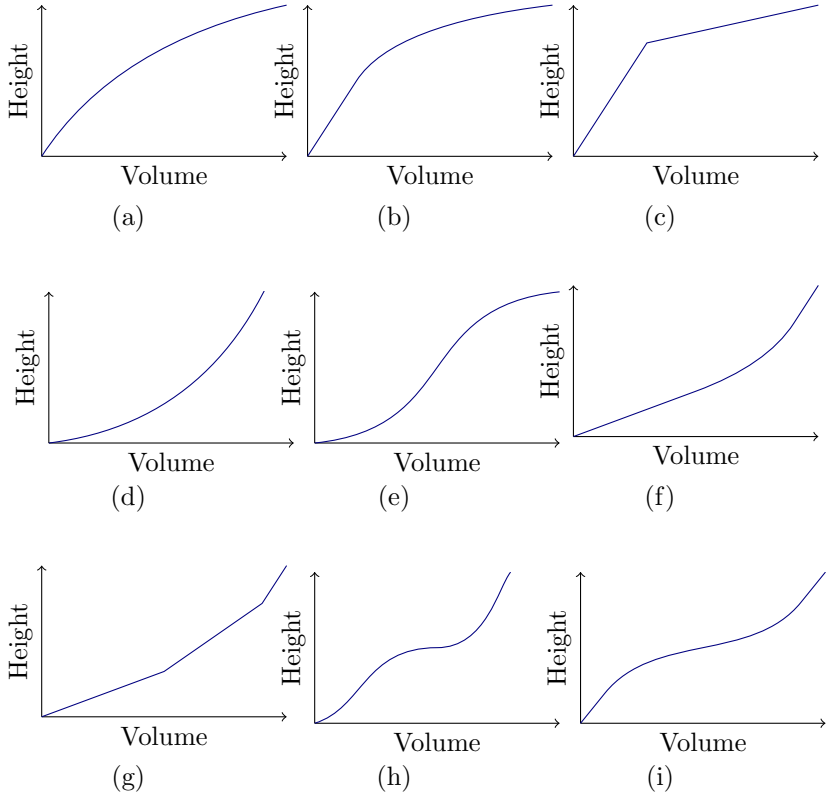
3. Sketch two more for E and F:



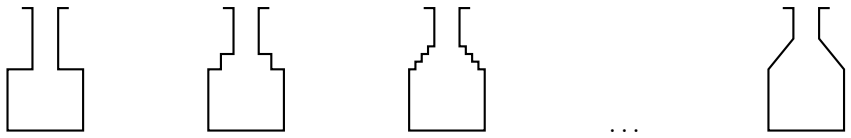
4. Here are six bottles and nine graphs. Choose the correct graph for each bottle. Explain your reasoning clearly. For the remaining three graphs, sketch what the bottles should look like.



Ink bottle | Conical Flask | Evaporating flask | Bucket | Vase | Plugged funnel



5. Draw height-volume graphs for the following sequence of bottles:



Using your sketches explain why a bottle with straight sloping sides does not give a straight line graph (that is, explain why the ink bottle does not correspond to graph (g)).

6. Invent your own bottles and sketch their graphs on a separate sheet of paper. Pass only *the graphs* to your neighbor. Can he or she reconstruct the shape of the original bottles using only your graphs? If not, try to discover what errors are being made.

7. Is it possible to draw two different bottles which give the same height-volume graph? Try to draw some examples.