1.　A U-shaped manometer tube (height ~ 0.5 meters) is partly filled with water as shown on the right. The right end of the tube is closed at the top, but the left end is open to the atmosphere. There is no air between the stopper and the water surface on the right-hand side. Please explain your reasoning in your answers to each of the questions below.

A.　Rank the pressures at points *V, W, X, Y,* and *Z*
Sketch pressure contours in the water and in the air.

B.　Is the pressure at point *Z greater than, less than,* or *equal to* atmospheric pressure?
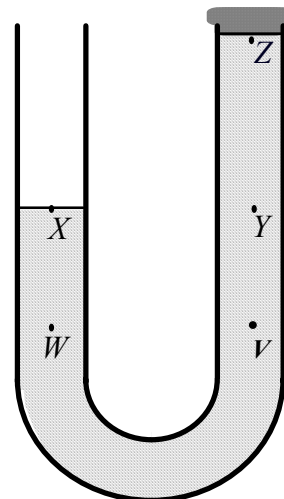
A syringe is used to remove some water from the left-hand side and oil is added to the tube. The density of the oil is less than the density of water ($\rho_{oil} < \rho_{water}$).

C.　Is the pressure at point V *greater than, less than,* or *equal to* the pressure at point W?

D.　Is the pressure at point *Y greater than, less than,* or *equal to* the pressure at point *X?*
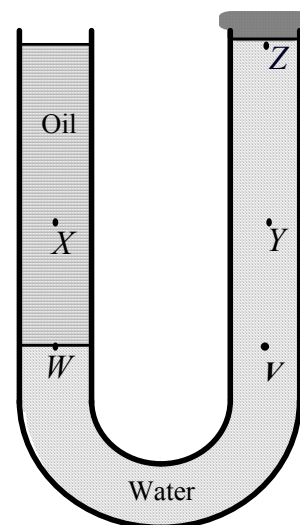
2. Now consider the U-tube shown on the right, which is open at the top on both sides. The diameter of the right tube is one and a half times that of the left tube. Water is poured into the U-tube such that the water level on the left is as shown in the diagram. The water level on the right is not shown.

A.　Sketch the water level on the right.

B.　Is the pressure at point *A greater than, less than,* or *equal to* the pressure at point *B*

C.　Is the pressure at point *C greater than, less than,* or *equal to* the pressure at point *D?*