

In chemistry, the molar concentration,  $c_i$  is defined as the amount of a constituent  $n_i$  (usually measured in moles – hence the name) divided by the volume of the mixture  $V$ :

$$c_i = \frac{n_i}{V}$$

It is also called molarity, amount-of-substance concentration, amount concentration, substance concentration, or simply concentration. The volume  $V$  in the definition  $c_i = n_i/V$  refers to the volume of the solution, *not* the volume of the solvent. One liter of a solution usually contains either slightly more or slightly less than 1 liter of solvent because the process of dissolution causes volume of liquid to increase or decrease. So, if you have one liter of commercial acid the weight of it is:

$$m = 1000 \text{ ml} * 1.787 \text{ g/ml} = 1767 \text{ g}$$

The mass of acid in this case is:

$$m_a = 1767 * 86\% / 100\% = 1519,62 \text{ g}$$

Amount of acid is:

$$1519,62 / 98 = \mathbf{15,5} \text{ mol the same is molarity ( it was calculated for one liter )}$$

Second part:

If you need 0,2 M solution, it means that it is 0,2 mol in one liter.

So you need dissolve some volume X of 15,5 M solution that includes 0,2 mol of acid.

If 1000 ml includes 15.5 mol

X ml includes 0,2 moles

$$x = 12.9 \text{ ml}$$

So you need mix 12.9 ml of commercial acid with 987,1 ml of water. (Together it's one liter.)