Problems 5 and 1 were the main questions. I did an example of using the “rungs and clause gadgets” architecture to reduce 3SAT to another an NP-complete problem.

The single picture doesn’t show how I unfolded the logic of the reduction by first designing the rungs to offer a choice between the left edge for setting $x_i = true$ or the right-hand edge for $x_i = false$. 
Here was a followup question aimed at getting reductions in the right direction:

The answer is the latter, because this f makes edges (black) **become** vertices (red). The last bit was a fact relevant to problem 4: if two classes have different **closure properties**, then we know they cannot be equal, even though we may not be able to prove that neither contains the other.