Optimization

1) Emerson decides to become a farmer and but needs to buy all of her farming supplies on a budget. She only has 750 feet of fencing with which to work and wants to enclose a rectangular area dividing it into a row of four equal subdivisions. Find the maximum total area possible with this much fencing.

2) Charlie and Tycco can see that she's doing it all wrong and needs to decide on an area first then find the minimum amount of fencing needed to enclose that area in order to optimize her budget. After the initial cuss-filled argument (all by Emerson), they decide to work together to enclose 15,000 square feet with the same 4 subdivisions. Find the minimum amount of fencing that they will need.

3) Joseph, Niall, and Prince need to find a way to use the least amount of cardboard to make a closed box with square ends and a volume of 8 m³. How much cardboard will they need?

4) Ava, scolding as always, tells them that they are doing it all wrong and need to use 25 m² of cardboard and maximize the volume. Is she right? Will they produce a box with greater volume?