

G.M.A. Trees
Oak Grove Avenue
Pinneapolis, PU 22222
December 1, 2014

Calculus Student
Brigham Young University
Provo, UT 84602

Dear calculus student,

My boss, Mr. George Bush, has asked me to solve a problem for him, and has recommended that I ask some experts for help. We need to design water tanks for a greenhouse that was built a few months ago, so that we can store water for the dry season. Mr. Bush wants the plans for the tanks made by December 11, so that we can get our contractors hired and ready to begin construction by January 1.

The water tanks that we need are simple enough. We would like them to have a square base, and rectangular sides. They each need to hold 7500 gallons of water. After they are built we will drill holes and add spigots and caps to fill them, but we would like them to be built to be as cost-efficient as possible.

Our contractors will provide the metal for the tanks at a cost of \$10 per square foot (for the basic single thick metal). This metal will be fine for the top of the tank, but because of the pressure of the water that they need to hold, the sides need to be made of reinforced material that costs \$20 per square foot, and the bottom needs to be made of extra thick reinforced material that costs \$30 per square foot.

The pieces will need to be welded together into a rectangular box. The welds on the base and the sides of the tank need to hold up to the pressure of the water, and so need to be extremely strong—these welds will cost us \$30 per foot. The welds on the top do not need to hold up to much pressure at all, so they only cost us \$10 per foot.

As I said, we will add spigots and other hardware after the construction of the tanks, and their cost will not depend on the dimensions of the tank, so you don't need to worry about them.

The concrete slabs that we have to put the tanks on are 15 feet by 15 feet, so the tanks can not be larger than that. In addition, the building code will not allow us to have tanks more than 20 feet high, without getting a variance, which would be extremely difficult.

If you can help us out, we would be greatly indebted to you. Our company is struggling a bit, and every dollar is vital. Mr. Bush says that you are experts at solving any mathematical problem, and that you will be able to tell us how to make the tanks fit our specifications and still be as cheap as possible. Please tell us what dimensions the tanks should have, and how much they will cost.

Thank you,

Steve Birch
Assistant to George Bush