

RDM Manufacturing
21 Bridge Street
Queens, NY 11356

November 23, 2015

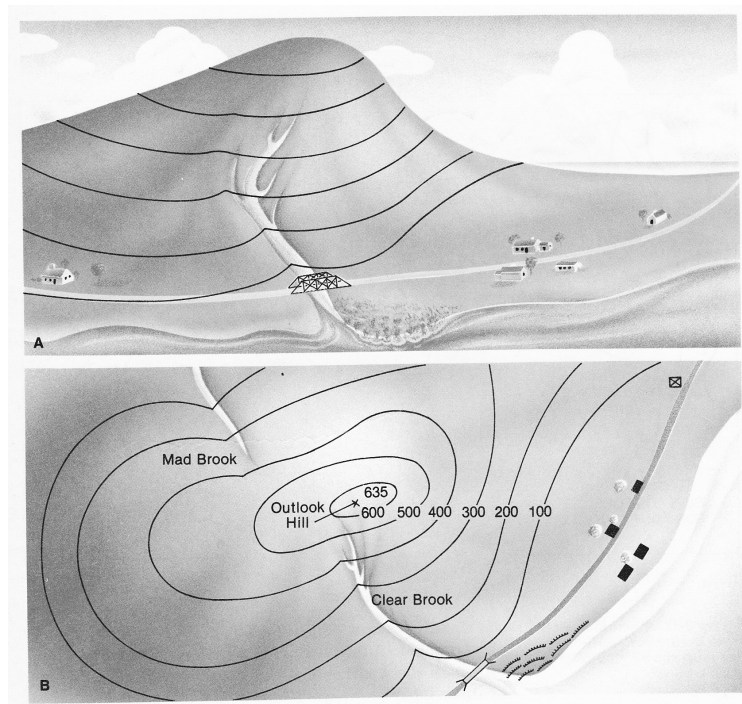
Calculus II Student
Adelphi University
1 South Ave
Garden City, NY 11530-0701

Dear Sir or Madam:

Our company was recently hired to assess a building project for the Mayor of Springfield, Mayor Joe Quimby. Unfortunately our engineers are too busy with other projects to spend time on this recent bid. As you are our top consultant, you have been hired to complete the assessment of this job for us. We are thankful for your help.

In regards to the project, the Mayor is wanting to build his new estate on top of Outlook Hill in Western Massachusetts. He has purchased the land and is needing someone to determine the type of foundation needed for his new structure. For some reason none of the local companies are willing to help him out with his project; something about ruining the beauty of the town. This is great news for us and is why we are reaching out to you.

Unfortunately, these are tough economic times, and even a large firm as ourselves have been hit by the crisis. As such, we had to liquidate much of our assets, surveying equipment being among the list. We were however able to procure a graphic of the hill the Mayor wishes to build on.



All units in this image are in feet and we are told the distance between the 400 ft mark and the 300 ft mark is roughly 40 ft.

Given the Mayor's lavish lifestyle, he plans on building a three story house on top of Outlook Hill. To do this he wishes to remove the top 40 feet of the hill and place his house on top. He has informed us that his new estate will use up as much as the new surface area as possible.

This is where your expertise will come in. As the top of the hill will be excavated, it is quite possible that the ground may not be as solid as we like. In particular, there may be sink holes in the dirt and we want to be sure the house will not cave into the ground once build. We are hiring you to determine whether or not Mayor Quimby's house will sink into this fresh soil.

After describing the needs to our engineers, they suggested that you might find the following pieces of information useful:

- Rules of thumb around the construction industry are that an average house weighs 200 pounds per square foot for a single-level home, 275 for two levels and 350 for three levels. This figure is predicated on no heavy features such as tile roofing or extensive masonry work, but includes foundation.
- The soil in the area is slightly rocky but is said to have a uniform density.

I need you to write up a full report to our team of engineers. They are interested in the mathematics, so make sure you explain your ideas. Also, some of them have been away from math for a while, so if you use any interesting facts, please make sure and cite them. I have heard that the book by Matthew Boelkins is a nice reference.

We have hired a consultant, Dr. Branden Stone, to help with the write-up of this project. Please seek his help if you have any questions.

In order to be assured this bid, I will need your report by Friday, December 18.

Yours Faithfully,

Ron D. Malfoy