1. A cable is to be run from a solar farm on one side of a river to an office park on the other side. It costs \$4 per meter to run the cable over land, while it costs \$5 per meter to run the cable under water. Suppose the river is 200 meters wide and the office park is 1000 meters downstream from the solar farm.

   (a) What is the most economical route to lay the cable?

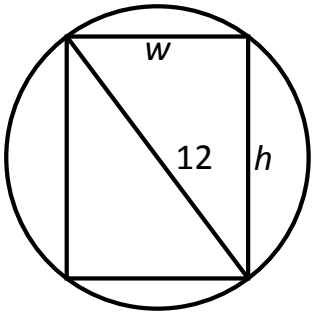
   (b) How much will it cost?

2. Trader Joes is designing a cylindrical can to hold 1 liter of chicken broth. Suppose the side costs 0.02 cents per square cm and the top and bottom cost 0.04 cents per square cm.

   (a) What are the dimensions that will minimize the cost?

   (b) How much will it cost?

3. The strength S of a wooden beam is directly proportional to its cross sectional width w and the square of its height h. That is, $S = kwh^2$ for some constant k.



   Given a circular log with diameter of 12 inches, what sized beam can be cut from the log with maximum strength?