Sigma Tournament

Day 1: Physics & Math

Tour 1

1) The side AC of the triangle ABC is 3.8 and the side AB is 0.6. It is known that the side BC is an integer number. What is the length BC?

2) A Ping-Pong ball is tossed into the air. Will it take longer for it to go up or to come back down?

3) Find all solutions of the following equation
1-17(1-17(1-17(1-17(1-17(1-17x)))))= x

4) A raft and a motorboat left town A simultaneously and traveled downstream to town B. (The raft always moves at the same speed as the current, which is constant.) The motorboat arrived at town B, immediately turned back, and encountered the raft two hours after they had set out from A. How much time did it take the motorboat to go from A to B? (Assume that it travels at a constant rate of speed.)

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Tour 2

Experimental problem!
(4 points for very complete solution)

You are given a planar figure of irregular shape (cutout from the cardboard) and a set of "tools": threads, plastic balls, pushpins, couple of nails and screws, pencils, ruler, plastic cups, matches, paper clips. The goal is to find the location of the center of mass of the figure as accurately as possible.