

- ① There are very few water heaters in Iceland. About 87% of the buildings there are heated using geothermal energy (piped directly from the ground). Hot tubs are typically just that - tubs filled from the bottom with lava-heated water and drained from the top to keep them from overflowing. There are no heaters or jets - no machinery at all.

Consider the following questions and include any assumptions you are making in the process of answering them.

- (a) What would be a reasonable estimate of the rate at which water flowed in to such a tub?
- (b) Assuming water drained from the tub at the same rate, how many liters of water per day would this process consume?
- (c) Estimate how long it would take to fill a typical hot tub at this rate.
- (d) If the in-flow is continuous and the mixture uniform, how long before the impurities left by a bather are satisfactorily removed?