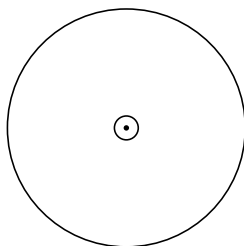


The problems are available at <http://jan.ucc.nau.edu/ns46/pow>. Paper copies are provided outside the Math Office: Room 107, Adel Mathematics Building. Contact Nándor Sieben (Adel 175) if you have any questions about the problems. Please submit your solutions to the Math Office by Monday 9/14/09. Winning solutions and a summary of scores are at the POTW bulletin board in the Adel Math Building.

Research problems with unknown solutions are marked by (!). These problems might be hard or might be easy, we just do not know. A conjecture or a result about a special case or simply an idea about a possible solution method can be very valuable.

Cut the cake

a) It is little Johnny's first birthday. His circular birthday cake has a candle in the center. Johnny has yet to learn how to share so the cake has to be cut into congruent pieces. Grandpa is allergic to all non-organic substances so his piece cannot touch the candle. How can we cut the cake into finitely many congruent pieces so that at least one of the pieces has no contact with the candle in the middle of the cake?



(!) b) Can this be done with a cake that has the shape of a sphere and has a dead fly in the center?