This is a take home exam. You may use any of the resources used in class, including homework, your activity manual, and your resource manual. You are expected to work as a group to solve each of the following problems. You should not consult other groups, the internet, tutors, or other friends. You may consult your instructor.

Make certain that everybody in the group participates in each part of each question, and understands the solutions well enough to answer questions about them. Your group need only turn in one set of solutions, but be sure that everyone’s name appears on the exam you turn in.

Take your time and think logically and carefully. Write down anything that you think is relevant and show all of your work. Try to demonstrate as much knowledge and creativity as possible. Explain any claims you make thoroughly. Each problem is worth 10 points. You have until class on Friday, 27 February to complete this exam. Good luck!!

Distributed with this exam is a peer evaluation form. Please give one form to each group member. Each person should fill out the form individually after the group exam has been completed. Be honest but fair in your evaluations. Return the completed forms to me with your individual exam on Friday. Note that filling these out is worth points in your evaluation grade, so be certain to bring them back!

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Total: _____ of 20
1. You have been apprenticed to a master table arranger. He gives you the task of arranging 427 identical square-topped tables to meet the following criteria.

(a) Joined tables must share at least one complete side.

(b) Table tops must form a contiguous region

(c) Exactly one person must be seated at each exposed side.

(d) If the table arrangement surrounds an open area, people must be seated in the interior.

What is the smallest number of people that must be seated at these 427 tables arranged as indicated? Draw pictures to illustrate your work.

2. For each figure shown below, find the perimeter, and use two different methods to find the area. Assume that the horizontal and vertical distance between two adjacent dots is one unit. Justify your computations.