

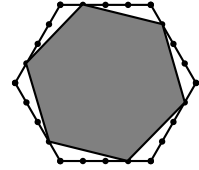
Mathematics 414, Problem Set #6
(due by 1:00, October 20)

Problem 1. Note that

$$7^2 = 49, \quad 67^2 = 4489, \quad 667^2 = 444889, \quad 6667^2 = 44448889.$$

Show that the apparent pattern continues forever.

Problem 2. The outer hexagon is regular. Each side of this hexagon is divided into 4 equal parts. Some division points are joined as shown to form the shaded regular hexagon. What fraction of the area of the outer hexagon is shaded?



Problem 3. For what values of p are there 3 real numbers in geometric progression whose sum is p and the sum of whose squares is 1?

Problem 4. Please do (i) or (ii).

(i) Make up and solve a 6/7 or 8/10 workshop problem. Use an idea from an explicitly identified workshop problem from 2004 or before. The problem should be ready to type “as is.”

(ii) If you have in past assignments created a problem that I suggested you modify and hand in again, do so, in a form ready to become a 2010–2011 workshop problem (no solution needed).

Problem 5. Make up and solve an 8/10 or 11/12 workshop problem, getting inspiration from an explicitly identified Euclid problem from 2004 or before. Ideally, the problem will bring out *ideas* that you think students should know about. The problem should be ready to type “as is.”

Assignment: Write out for yourself solutions to the 2009–2010 workshop problems, solutions that when necessary go beyond or improve on the solution sketches provided. This is necessary for effective handling of the problems during a workshop. And the midterm (scheduled for November 5) will be closely related to these workshop problems.