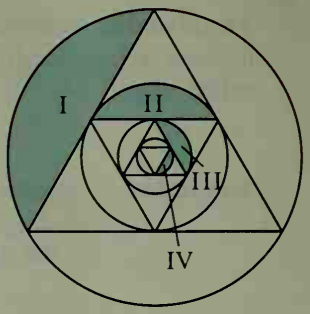
5. The figure shows a series of equilateral triangles and circles inscribed within each other. Transformation T, which maps region I to region II, is the result of performing a rotation followed by a dilation.

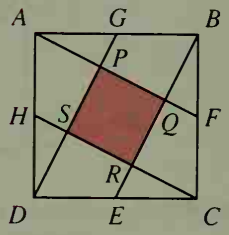
a. Give the number of degrees in the rotation and the scale factor of the dilation.

b. What is the image of region I by the transformation T? T^2? T^3?

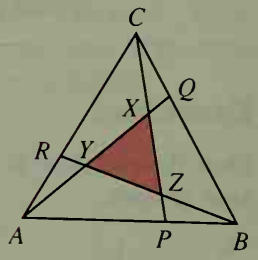
c. If region I has area 1, give the areas of regions II, III, and IV.



6. E, F, G, and H are midpoints of the sides of square $ABCD$. If the area of square $PQRS$ is 1, what is the area of square $ABCD$? (*Hint:* Rotate $\triangle APG$ 180° about G. Rotate in a similar manner $\triangle BQF$, CRE, and DSH.)



★ **7.** Exercise 32 on page 460 is difficult to prove synthetically. Recall that points P, Q, and R divide the sides of $\triangle ABC$ into 2:1 ratios. Follow the strategy of Exercise 6 above to prove that the area of equilateral $\triangle ABC$ is seven times the area of equilateral $\triangle XYZ$. (*Hint:* Draw an auxiliary line from X to the midpoint, M, of $\overline{CB}$. Rotate $\triangle CXM$ 180° about M. Repeat for the other two sides of $\triangle ABC$.)



8–10. Work Exercise 31 on page 527, and Exercises 34, 35 on pages 551–552.

Deciding Which Method to Use in a Problem (Chapter 13)

Objective: Learn to recognize clues that indicate whether a coordinate, transformational, or synthetic approach is most suitable for a problem. (Requires completion of Chapters 13 and 14)

When facing a geometry problem, how do you know when to use a coordinate, transformational, or traditional (usually called *synthetic*) approach? Many problems can be solved in more than one way, but often one approach is simpler than another. Here are some tips to help you decide which method may be most suitable for a given problem.