Problem 1. Connect each vertex of the equilateral triangle the center of the circle and extend it to the opposite edge. Use Pythagorean Theorem to find the height and the base of the triangle.

Problem 2. Try to avoid using the angle argument. Try to use, instead, Pythagorean theorem. Use the figure provided on Page 9.

Problem 3. Connect each vertex to the center. You obtain 6 identical (congruent) triangles. Use the results of Problem 2 to find the base and height of these triangles.

Problem 4. Use the figure on Page 9. Now, you have 12 small identical triangles. All of them are isosceles with sides equal to 1, the radius. To find the base, you need to see that the base is a hypotenuse in a smaller right angle triangle. To find the height, use Pythagorean theorem.

You may need to do these exercises in your calculations on *the distributive law*:

$(2+\sqrt{3})^2 = (2+\sqrt{3})(2+\sqrt{3}) =$

$(2-\sqrt{3})^2 = (2-\sqrt{3})(2-\sqrt{3}) =$

$(2+\sqrt{3})(2-\sqrt{3}) =$

Problem 5. The same method used in Problem 4. If you want to see a nice pattern, you may wish to calculate the exact results for a 48-gon.

Problem 6. Try to make a chart of information you need to find the area of a regular polygon with 3×2^n sides: *number of sides, the base, the height, the area of the small isosceles, the area of the regular polygon.* If you want to see a nice pattern, you may wish to calculate the exact answers to these quantities for a 48-gon.

Problem 7. A good way is to find the relations between the bases and the heights of those isosceles of polygons with 3×2^n and $3 \times 2^{n+1}$ sides.

Problem 8. The process should be the same. But the calculation could be more demanding.

Problems with an asterisk * beside their numbers are harder problems. You may need to explore them for a longer period of time.

Problem 13. You may wish to try this on a rainy day when you have plenty of time. Again, the Pythagorean theorem is all you need. There is a connection between the inscribed and circumscribed regular polygons.

Problem 15. You do not need to use regular polyhedrons in order to approximate the volume. You will need, though, the volume formula of a pyramid.