

Math 4990 Problem Set 9*Due Tuesday, Nov 04, 2014 in class*

Please try to do the assignment without consulting the Internet or books.

If you really must use other resources, cite your source and write your solution in your own words without copying.

ASSIGNMENT

Liberally peruse **pages 156–176** of [DO].

[DO] Exercises 6.17, 6.22 (it may be helpful to do Exercises 6.19–21 first), and 6.30.

Problem 4. Verify Euler's formula for genus $g \geq 2$ as follows. Create a polyhedron of genus g . Calculate its Euler characteristic directly and compare it to $2 - 2g$. (Of course, your argument should work for all $g \geq 2$. You may use the construction in Figure 6.6 if you wish.)

Problem 5. A soccer ball is a convex polyhedron with regular pentagons and regular hexagons as faces. Prove that it has exactly 12 pentagonal faces. From the information given, is it possible to determine the number of hexagonal faces?