

**MA310**  
**Homework #6**  
**Due Tuesday, April 17**

The solutions to the following problems should be written using proper English (and mathematics!), and clear enough for someone who is not in this class, and has not had the benefit of the classroom discussion, to follow.

1. Make an *accurate* drawing of each of the tilings that can be obtained from the plane clusters that can be extended. You may use the templates that I passed out in class, or a computer program, or traditional compass and straight-edge to create accurate regular polygons.
2. Prove that the plane cluster 4-5-20 cannot be extended to tile the plane.
3. For each of the following three-dimensional polyhedra, make a good sketch, label the vertices (corners), and list the coordinates of the vertices.
  - (a) Cube (4-4-4)
  - (b) Tetrahedron (3-3-3)
  - (c) Octahedron (3-3-3-3)
  - (d) Square-based pyramid (the base is a square and the four sides are equilateral triangles).
  - (e) Cuboctahedron (3-4-3-4)
  - (f) Pentagonal prism (4-4-5)
  - (g) Truncated cube (3-8-8)
4. Extra Credit: Find the three missing plane clusters.