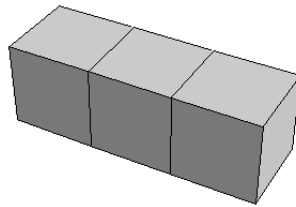


ASSIGNMENT 4—DUE FRIDAY, MARCH 2, 2007

Please write your answers on a separate sheet of paper. (If you turn in more than one sheet, please staple the pages together.)

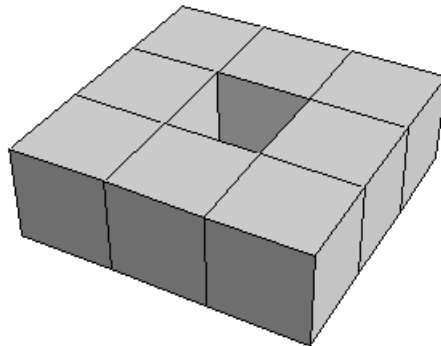
1.
 - a) If a planar graph has 6 vertices and 5 faces, how many edges must it have?
 - b) Draw an example of such a graph in which every vertex has the same degree. (Remember that the outside counts as a face.)
 - c) Draw an example of such a graph in which it's not true that every vertex has the same degree.

2. The solid below consists of 3 cubes glued together. Just counting features on the outer surface gives 16 vertices, 28 edges, and 14 square faces. Fortunately, $16 - 28 + 14 = 2$, so Euler's formula is true for this solid.



- a) Make a planar drawing of the graph for this solid.

Now, consider the polyhedron below—it consists of 8 cubes connected in a “donut” shape. Counting its vertices, edges, and faces as in the example above:



- b) How many vertices, edges, and faces does it have?
- c) Does it satisfy Euler's formula? If so, explain why. If not, why not?