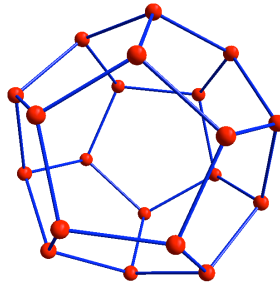


Name: _____

MATH 110 – EXAM 4
3 November 2004
Dr. Szczepański. Version A.

Directions: There are ten questions on this exam. Answer every question. Show all work and justify your answers. Each question is worth five points.

1. Consider the following Platonic Solid:



- (a) What is its name?
- (b) What is the name of the Solid that is *dual* to this one?
2. What does it mean for two objects to be *equivalent by distortion*?
3. Augusta has drawn a planar graph. Her graph has 145 vertices and 101 regions. How many edges are there in her graph?

4. (a) Are \otimes and \oslash equivalent by distortion? Why or why not?

(b) Are $\neg\circ$ and \oslash equivalent by distortion? Why or why not?

5. (a) How many regular polygons are possible?

(b) How many regular polyhedra (also called *Platonic Solids*) are possible?

6. I am thinking of a Platonic Solid. Each face of my solid has three sides. Each vertex of my solid has four edges leaving it.

(a) What is my solid?

(b) Which solid is *dual* to mine?

7. Olympia says that she has drawn a planar graph with 78 regions and 64 edges. What do you think of her claim?

8. Fill in the following values for the cube:

Vertices

Faces

Edges

Sides on a face

Number of edges leaving each vertex

9. Are a sphere and a torus equivalent by distortion? Why or why not?

10. Write your name on both strips of paper. Depending your last name, do *one* of the following:

Abercrombie – King: Make a cylinder out of the white strip. Make a Möbius strip out of the orange strip.

MacDonald – Zarchin: Make a cylinder out of the orange strip. Make a Möbius strip out of the white strip.

Bonus (3 points) Imagine you have a tetrahedron made out of clay and you slice off all its corners. Describe the shape that you end up with. What do its faces look like? How many faces does it have? How many edges? How many vertices? Try to sketch it.