Class Prep (prepare for Friday, January 26)

- Find a Hamilton circuit in the graph of the truncated icosahedron (soccer ball) and use it to plan a proper 3-edge coloring of that graph (if you didn't finish this in class).
- Draw some more connected planar graphs and count their vertices, edges, and faces/regions. Look for patterns in your data and make conjectures.

Also, because we didn't write this down in class, here's a graph theory definition you should know:

Definition 1. *The* degree *of a vertex in a graph is the number of edges coming in to that vertex.*

Problems (due Friday, February 2 at the beginning of class)

Some relevant graph theory definitions:

Definition 2. *A* cycle *in a graph is a sequence of connected edges that begins and ends at the same vertex and does not repeat any other vertices.*

Definition 3. *A* tree *is a connected graph with no cycles.*

Definition 4. *A* spanning tree *for a connected graph G is a tree that contains all the vertices of the original graph G and only edges that are also edges in G.*

1. Find a spanning tree for the graph of the dodecahedron.
2. Draw several trees and find the number of vertices, edges, and faces/regions for each tree. Make a conjecture about a relationship between these numbers and prove your conjecture.

Friday's Celebration of Learning

You should be able to

- find the generators of $(\mathbb{Z}_n, +)$ and $(\mathbb{Z}_n^*, \cdot)$.
- explain what elements of $\mathbb{Z}_n$ are in $\mathbb{Z}_n^*$ and why.
- draw a plane diagram of a solid (a simpler solid than a soccer ball or even a dodecahedron, I promise!).
- find a Hamilton circuit in a planar graph (also an easier one than that of a soccer ball).
- use a Hamilton circuit to create a proper 3-edge coloring of a planar graph.