This list is intended as the start of a study guide. There is no guarantee that because a topic is listed here that it will be on the midterm, and I certainly can't cover all these topics in one hour!

One of the best ways to study is to use the solutions I've posted. Compare them with your solutions. Come see me if you have questions about what might have gone wrong.

Everyday computation:

- Be able to compute curvature and torsion of curves (unit speed or not).
- Compute the length of a curve.
- Compute critical points and regular points of a function.
- Determine where a patch is regular.

More interesting tasks:

- Sketch curves with a given property. (e.g. a simple closed curve with two vertices)
- Be able to show a set isn't a surface. For example, you can use the fact that the tangent space of a surface is two dimensional.
- Be able to use the Frenet equations in computations.
- Determine when level sets of functions are surfaces.
- Find charts to cover surfaces.
- Show two surfaces are diffeomorphic.
- Know the definition of the wedge product and how to use it.

Proofs and the big picture:

- Know the difference between curvature and signed curvature.
- Know what the Fundamental Theorem of Curves means.
- Know what the Four Vertex Theorem tells you.
- Know what the Theorem of Turning Tangents tells you and how to use it.
- Be able to use the formula $\frac{d}{dt}\langle\alpha(t),\beta(t)\rangle = \langle\alpha'(t),\beta(t)\rangle + \langle\alpha(t),\beta'(t)\rangle$ to prove neat things.