FUNDAMENTAL CONCEPTS IN DIFFERENTIAL GEOMETRY
FALL 2000
HANDOUT # 5

1. Exercises for the Proper Course

1. Fill in missing details in the proof of the theorem about submanifolds intersecting transversally (Theorem 7.7 in Bredon's book). I would like you to address specifically to the following points.

(a) The first part of the theorem was proved locally. Why is this enough ?
(b) The last statement of the theorem is not explicitly proved, namely it is not clear why the chart θ has the properties promised in the second statement of the theorem.

Any other detail which you feel was omitted should be filled in.

Remember: The details that were omitted by Bredon are not gaps in his proof! If you start writing more than several lines, you are probably missing a certain point.

2. Find an explicit embedding of $\mathbb{R}P^2$ in $\mathbb{R}^n$ for some n.

2. A mini course on surfaces

Please address this exercise only if we discuss Gauss' theorem in class.

3. Are the following pieces of surfaces M and N isometric ?

- M is a piece of a torus, N is a piece of a plane.
- M is a piece of a sphere, N is a piece of a plane.
- M is a piece of a saddle given by the graph of the function $z = x^2 - y^2$, N is a piece of a plane.

Date: 28 Nov., 2000.