**Metric Spaces**

**Exercises**

1. Draw he unit balls for , for , and for . For extra credit, can you *describe* the unit balls in the three n-dimensional spaces, perhaps in words?
2. Show that , , and really are metric spaces
3. Draw or describe the unit ball for
4. Find the distance between and : in and in
5. Prove the Cauchy-Schwartz Integral inequality *(Hint: try to use a ‘smart’ proof similar to the smart prove of the regular Cauchy-Schwartz inequality)*
6. Show that is a metric space (hint: use the Cauchy-Schwartz integral inequality)
7. Verify Minkowski’s as well as Hoelder’s inequality for and
8. Show that if  are proportional, then Minkowski’s inequality turns into an equality
9. Show that with , ,is a metric space, denoted by (Note that we already have introduced for , and .