Math 624 Problem Set #2 Due Friday, Oct. 4, 2002

Part I:

Read Fulton, Chapter 1, sections 1-7.
Do problems:

1.4-1.6 on pp.6-7;
1.8, 1.9, 1.14, 1.15 on pp.9-10;
1.25, 1.26, 1.29 on pp.17-18;
1.35 on p.24.

Part II:

Read Hartshorne, Chapter I, sections 1-3.

1. Do problems:

1.11, 2.2, 2.9-2.13, 3.1, 3.2.

2. Following Bourbaki, call a topological space *quasi-compact* if every open cover has a finite subcover. Call it *compact* if it is quasi-compact and Hausdorff.

(a) Show that *every* affine variety is quasi-compact in the Zariski topology, but that *no* affine variety, except for a finite set of points, is compact in the Zariski topology.

(b) Which affine varieties over $\mathbb{C}$ are compact in the (classical) metric topology?

(c) Does your answer to (b) remain true over $\mathbb{R}$?