PROBLEM SET 1

(This will not be graded, but you are still welcome to e-mail me solutions for feedback or ask questions about any problems. Treat this as optional practice with sheaves or as pointers to sections of Vakil that I didn't cover in class but might be interesting reading.)

(All Exercises are references to the November 18, 2017 version of *Foundations of Algebraic Geometry* by R. Vakil.)

Problem 1. Exercise 2.2.J (stalks of $\mathcal{O}_X$-modules are $\mathcal{O}_{X,p}$-modules - you will want to read Section 2.2.13 before doing this)

Problem 2. Exercise 2.3.C (sheaf Hom)

Problem 3. Exercise 2.4.B (support of a section is closed - you will want to read Section 2.4.2 before doing this)

Problem 4. Exercise 2.5.D (gluing sheaves together - the hint given by Vakil will require reading the preceding part of Section 2.5, but you can also do this without using a base if you prefer)

Problem 5. Give a single example of a presheaf $\mathscr{F}$ that simultaneouly fails both sheaf axioms (identity and gluability, as in Section 2.2.6), and compute its sheafification.