PROBLEM SET 6 (DUE ON THURSDAY, NOV 8)

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

Problem 1. Exercise 7.1.B (fiber products of open embeddings - there is a discussion of fiber products in Section 1.3.6)

Problem 2. Exercise 7.3.K (finite morphisms have finite fibers - you can assume Exercise 7.3.H, but that exercise is worth thinking about as well)

Problem 3. Exercise 7.3.M (integral morphisms are closed - the key here is the Lying Over Theorem (7.2.5), a result in commutative algebra on integral extensions)

Problem 4. Exercise 8.1.H (closed subschemes correspond to quasicoherent ideal sheaves)

Problem 5. A *quadric* in $\mathbb{P}^n_k$ is a closed subscheme cut out by a single homogeneous polynomial of degree two (see 8.2.2). Give an example of two quadrics in $\mathbb{P}^2_{\mathbb{R}}$ intersecting in a single point, and compute the scheme-theoretic intersection. Then give a second example of this, with scheme-theoretic intersection not isomorphic (as schemes) to that in your first example.