PROBLEM SET 8 (DUE ON NOV 10)

(All Exercises are references to the December 29, 2015 version of *Foundations of Algebraic Geometry* by R. Vakil.)

Problem 1. Exercise 9.2.C(a) (fiber product of closed subschemes is their intersection)

Problem 2. Exercise 9.3.B (underlying topological space of scheme-theoretic fiber is topological fiber)

Problem 3. Exercise 9.4.D (surjectivity is preserved by base change - you might find Exercise 9.3.C helpful)

Problem 4. Exercise 10.1.J (separated over $\operatorname{Spec} A$ and separated over $\operatorname{Spec} \mathbb{Z}$ are equivalent)

Problem 5. Describe two morphisms $\mathbb{A}^1_{\mathbb{C}} \to \mathbb{A}^1_{\mathbb{C}}$ such that the fiber product $X = \mathbb{A}^1_{\mathbb{C}} \times_{\mathbb{A}^1_{\mathbb{C}}} \mathbb{A}^1_{\mathbb{C}}$ using these morphisms has exactly two irreducible components and such that the two irreducible components intersect in exactly two points.