PROBLEM SET 2 (DUE ON TUESDAY, FEBRUARY 16)

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

Problem 1. Exercise 14.2.E (div and $D \mapsto O_X(D)$ are inverses)

Problem 2. Exercise 14.2.O (computing $\text{Pic}(\mathbb{P}^1 \times \mathbb{P}^1)$ - in the hint given by Vakil, "restricts to" can be taken to mean "pulls back by the inclusion morphism")

Problem 3. Let $X = \text{Bl}_{(0,0)} \mathbb{A}_k^2$ be the blow-up of the affine plane at the origin (as described in Exercise 9.3.F). Compute $\text{Pic}(X)$.

Problem 4. Classify all morphisms (of quasicoherent sheaves on $\mathbb{P}_k^1$)
$$\mathcal{O}_{\mathbb{P}_k^1}(m) \to \mathcal{O}_{\mathbb{P}_k^1}(n)$$
for $m, n \in \mathbb{Z}$.