

HOMEWORK 10

You may work on the problem set in groups; however, the final write-up must be yours and reflect your own understanding.

Problem 0.1. *Let X be a non-singular affine variety. Prove that $Cl(X) = 0$ if and only if the coordinate ring $k[X]$ is a UFD.*

Problem 0.2. *Let X be a non-singular variety. Prove that the projection $\pi : X \times \mathbb{A}^1 \rightarrow X$ induces a surjective homomorphism $\pi^* : Cl(X) \rightarrow Cl(X \times \mathbb{A}^1)$.*

Problem 0.3. *Let X be a non-singular variety. Use the previous problem to prove that $Cl(X \times \mathbb{A}^n)$ is isomorphic to $Cl(X)$.*

Problem 0.4. *Prove that an irreducible, non-degenerate curve of degree n in \mathbb{P}^n is the rational normal curve of degree n .*