

Numbers refer to problems in *The Arithmetic of Elliptic Curves* (second edition) by J. Silverman

Morphisms, divisors, differentials

1. Let $C : x^4 + y^4 = z^4$ be the Fermat quartic curve over a field K of odd characteristic. Show that the map $\phi(x, y, z) = [y^2, xy, x^2, z^2]$ is a morphism defined over K of C onto a curve $D \subset \mathbf{P}^3$ which is the intersection of two quadrics. Find a point in $D(K)$ and find a Weierstrass form for D .
2. 2.2
3. 2.3
4. 2.4
5. 2.9