

Math 4108 Homework 4

Due at the beginning of class on Tuesday, February 3.

There are fewer problems on this homework assignment, but a couple of them may require more thought.

§15.9 #1

§16.1 #1, 3

Problems not from the book:

1. Let $f(t, X) = X^2 - 2X + t \in \mathbf{C}[t, X]$ and let

$$S = \{(z, w) \in \mathbf{C}^2 : f(z, w) = 0\} \subset \mathbf{C}^2.$$

Define $\pi : S \rightarrow \mathbf{C}$ by $\pi(z, w) = z$.

For all $z \in \mathbf{C}$ find the number of points in the preimage $\pi^{-1}(z)$.

2. Let F be a field.

(a) Find an F -basis for the polynomial ring $F[u_1, \dots, u_n]$.

(b) Find an F -basis for the subring of symmetric polynomials in $F[u_1, \dots, u_n]$.