Math 256A. Problem Set #3

"Due" Thursday, 24 September—do not hand in

1. Do Exercise 2.14. Also show that, if $Y = \operatorname{im}\psi$, then there are unique morphisms $p\colon Y \to \mathbb{P}^r$ and $q\colon Y \to \mathbb{P}^s$ such that the composite

$$\mathbb{P}^r \times \mathbb{P}^s \xrightarrow{\psi} Y \xrightarrow{(p,q)} \mathbb{P}^r \times \mathbb{P}^s$$

is the identity function. Finally, recalling that $\mathbb{P}^N$ has coordinates z_{ij}, $0 \le i \le r$, $0 \le j \le s$, let W_{ij} be the subset $z_{ij} \ne 0$, let $Y_{ij} = Y \cap W_{ij}$, and show that $\psi^{-1}(Y_{ij}) = U_i \times V_j$, where $U_i \subseteq \mathbb{P}^r$ is the subset $x_i \ne 0$ and $V_j \subseteq \mathbb{P}^s$ is the subset $y_j \ne 0$.

2. Exercise 4.7

3. Exercise 4.8

4. Exercise 4.10