Algebraic Geometry : Homework 1

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Exercise 1:

(a) Show that any prime ideal is radical.

(b) Let I be an ideal in $k[x_1, ..., x_n]$. Show that $V(I) = V(\text{rad}(I))$.

(c) Let V be an algebraic set. Show that $I(V)$ is a radical ideal.

Solution :

(a) Let I be a prime ideal, let's show that $I = \text{rad}(I)$. It suffices to show that $\text{rad}(I) \subset I$ since $I \subset \text{rad}(I)$ is trivial.