1) Is every finite set in $\mathbb{C}^2$ an algebraic set?

2) Is $\{(x, y) \in \mathbb{C}^2 \mid |x|^2 + |y|^2 < 1\}$ an algebraic set?

3) Let $I$ be a prime ideal in $\mathbb{C}[x_1, ..., x_n]$. Show that the quotient ring $\mathbb{C}[x_1, ..., x_n]/I$ has no zero divisors.

4) Let $J \subseteq I$ be two ideals in $\mathbb{C}[x_1, ..., x_n]$.
   a) Show that there is a natural map $\mathbb{C}[x_1, ..., x_n]/J \rightarrow \mathbb{C}[x_1, ..., x_n]/I$ which is onto.
   b) Show that there is a natural map $\mathbb{C}[x_1, ..., x_n]/I \rightarrow \mathbb{C}[x_1, ..., x_n]/J$ which is 1-1.

5) Let $b^2 = a$. Show that $I = (x - a, y - b)$ is a maximal ideal in $\mathbb{C}[x, y]/(y^2 - x)$.

6) Describe in your own words what is meant by an equivalence problem.