Exercise 1. Let R be a ring, I an ideal of R, and consider the closed immersion $Y = \operatorname{Spec} R/I \rightarrowtail \operatorname{Spec} R = X$. Show that the associated sequence of $\mathcal{O}_X$-modules

$$0 \longrightarrow \mathcal{I}_Y \longrightarrow \mathcal{O}_X \longrightarrow i_*\mathcal{O}_Y \longrightarrow 0$$

can be identified with

$$0 \longrightarrow \widetilde{I} \longrightarrow \widetilde{R} \longrightarrow \widetilde{R/I} \longrightarrow 0\,.$$

Exercise 2. Let R be a ring. Let f be a homogeneous element of the graded ring $R[x_0, \ldots, x_n]$ of degree d and let $Y \rightarrowtail \mathbb{P}^n_R$ be the closed immersion corresponding to the homogeneous ideal generated by f. Give an isomorphism $\mathcal{I}_Y \xrightarrow{\sim} \mathcal{O}_{\mathbb{P}^n_R}(-d)$.

Exercise 3. Let $\varphi\colon R \to S$ be a homomorphism of rings, and let $f\colon Y = \operatorname{Spec} S \to X = \operatorname{Spec} R$ be the corresponding morphism of affine schemes. Show that if $f^\#\colon \mathcal{O}_X \to f_*\mathcal{O}_Y$ is surjective, then φ is surjective.
This generalizes [HAG], Exercise II.2.18(d).
Either prove this "by hand", or directly apply [HAG], Proposition II.5.6 ...