Math 918. Quiz #3

(1) Explain why there is a power series $f \in \mathbb{R}[\![x, y]\!]$ such that $f^2+(x+y-3)f+xy-2 = 0$.

(2) Let $R = \mathbb{Z}[x]$ and $I = (x^2 - 2)$. Describe an element of $\widehat{R}^I$ that is not an element of (the image of) R. You can use any way of describing elements of completions that we have discussed, and you don't have to prove that your element is not in R.