Answer on Question #82701 – Math – Abstract Algebra

Question

Is the polynomial ring $R[X]$ a subring of $R[[X]]$.

Solution

Yes, because every polynomial is the power series, with all but finitely many zero terms.

So, if $f(x) \in R[x]$, then $f(x) \in R[[x]]$ too, and $R[x]$ is closed under the addition and multiplication, so the sum of two polynomials and the product of two polynomials are polynomials again, so it is not only a subset of $R[[x]]$, but a subring of $R[[x]]$ too.