

Modern Algebra - Arithmetic in F[x] Cheat Sheet by hbrooke7 via cheatography.com/201797/cs/42754/

4.1 Theorems & Corollaries

4.1 Definitions/Things that are clear	
A <i>Polynomial</i> with <i>Coefficients</i> in R	An expression of the form: $a0+a1x+a2x^2++a_n_x^n$
(Let R be any ring)	where n is a nonnegative integer and $a_i \in R$
Expression: a0 + a1x + $a_2x^2 + +$ a_nx^n	An expression of this form makes sense, provided that the <i>a_i</i> and <i>x</i> are all elements of some larger ring
In Thm 4.1, the elements of the ring P are called	polynomials with coeffi- cients in R
In Thm 4.1, the elements a_i are called	coefficients
In Thm 4.1, the special	indeterminate

Theorem 4.1	(i) R is a subring of P.
If R is a ring,	(ii) xa = ax for every a∈R
then there	(iii) Every element of P
exists a ring P	can be written in the form
that contains	a0+a1x+a2x ² ++a_n_x ⁿ
an element x	for some n≥0 and a_i ∈ R
that is not in R	(iv)The representation of
and has these	elements in P in (iii) is
properties:	unique in this sense: if
	n≤m and
	a0+a1x+a2x ² ++a_n_x ⁿ
	=
	$b0+b1x+b2x^2++b_m_x^m$
	then a_i = b_i for i≤n and
	b_i = 0R for each i>n.
	(v)
	a0+a1x+a2x ² ++a_n_x ⁿ
	= 0R if and only ifa_i = 0R
	for every i.

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element x is called an

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Theorem 4.2

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