

# Section 5.3: Polynomials

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8:31 AM

term  $\equiv$  a single number or the product of a number and one or more variables raised to powers

polynomial  $\equiv$  a single term or a finite sum of terms in which the powers on the variables are positive integers

examples:  $7$ ,  $12a^2b^3 - 3$ ,  $\frac{3}{4}x^2y^{17}z - x$

non-examples:  $7x^{-2}y^3$ ,  $\frac{18a^2}{b^4}$ ,  $35\sqrt{p}$

terminology:

$5x^4 - 3x^3 + 7x - 2$   
degree  
leading coefficient  
constant term

monomial  $\equiv$  polynomial with one term

binomial  $\equiv$  " " two "

trinomial  $\equiv$  " " three

addition and subtraction:

$$(3x^2 - 7x + 5) + (2x^2 + 4) = 5x^2 - 7x + 9$$

$$(3x^2 - 7x + 5) - (2x^2 + 4) = x^2 - 7x + 1$$

multiplication of polynomials:

$$(x^2 - 3x + 2)(x - 4) = \begin{array}{r} x^3 - 3x^2 + 2x \\ -4x^2 + 12x - 8 \\ \hline \end{array}$$

$$\boxed{x^3 - 7x^2 + 14x - 8}$$

aka: distributing  
expanding  
multiplying out  
give the product  
remove the brackets

expand:

$$(w^2 - a)(t^3 + 3) = t^3 w^2 + 3w^2 - at^3 - 3a$$

$$(a^2 + a + b)(a^2 - a + b)$$

$$= \overset{\checkmark}{a^4} - \overset{\checkmark}{a^3} + \overset{\checkmark}{a^2 b} + \overset{\checkmark}{a^3} - \overset{\checkmark}{a^2} + \overset{\checkmark}{ab} + \overset{\checkmark}{a^2 b} - \overset{\checkmark}{ab} + \overset{\checkmark}{b^2}$$

$$= a^4 + 2a^2 b - a^2 + b^2$$

$$(2y^t - 3)(4y^t + 7)$$

$$= 8y^t y^t + 14y^t - 12y^t - 21$$

$$= 8y^{2t} + 2y^t - 21$$

$$(w^p - 1)(w^{2p} + w^p + 1)$$

$$= w^{3p} + \cancel{w^{2p}} + \cancel{w^p} - \cancel{w^{2p}} - \cancel{w^p} - 1$$

$$= w^{3p} - 1$$