Special Products

Definitions and Terms

Product – The result of multiplying

3 x 2 = 6, where 6 is the product of 3 multiplied by 2

Monomial – A number, variable or product of a number and variable where all exponents are whole numbers

42, 5x, $14x^{12}$, 2pq whereas 4 + y, $\frac{5}{y}$, 14^{x}, $2pq^{-2}$

Binomial – The sum or difference of 2 monomials

$3x - 2$
$5x^2 + 18$

Trinomial – The sum or difference of 3 monomials

$3x^2 + 5x + 6$
$4x^3 - 2x + 3$

Polynomial – The sum or difference of many monomials

$5x^2 + 10x - 2$
$4x^4 - 3x^2 + 5x - 8$

Degree – The sum of the exponents found in each term

Polynomial	Sum of exponents	Degree
$3pq = 3p^1q^1$	1 + 1 = 2	2
$3x^2$	2	2
$5a^2bc = 5a^2b^1c^1$	2 + 1 + 1	4

Degree of the polynomial – The largest degree among its terms

Polynomial	1st Term Degree	2nd Term Degree	3rd Term Degree	Degree of Polynomial
$5x^4 + 3x^2 + 4xy$	4	2	2	4

Special product – The products of binomials using patterns from the FOIL Method

FOIL Method

First, Outer, Inner, Last

Product of sum and difference = Difference of two squares

$(a + b)(a – b) = a^2 – b^2$

Square of a binomial = Perfect trinomial square

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

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

Product of any two binomials = General trinomial

$(ax + b)(cx + d) = acx^2 + adx + bcx + bd$

Cube of a binomial = Quadrinomial

$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

Product of binomial and trinomial

$(a + b)(a^2 – ab – b^2) = a^3 + b^3$

$(a - b)(a^2 + ab + b^2) = a^3 - b^3$