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, 14x12, 2pq whereas 4 + y, , 14x, 2pq-2

Binomial – The sum or difference of 2 monomials

3x – 2

5x2 + 18

Trinomial – The sum or difference of 3 monomials

3x2 + 5x + 6

4x3 – 2x + 3

Polynomial – The sum or difference of many monomials

5x2 + 10x – 2

4x4 - 3x2 + 5x - 8

Degree – The sum of the exponents found in each term

|  |  |  |
| --- | --- | --- |
| Polynomial | Sum of exponents | Degree |
| 3pq = 3p1q1 | 1 + 1 = 2 | 2 |
| 3x2 | 2 | 2 |
| 5a2bc = 5a2b1c1 | 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 |
| 5x4 + 3x2 + 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) = a2 – b2

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) = acx2 + adx + bcx + bd

Cube of a binomial = Quadrinomial

(a + b)3 = a3 + 3a2b + 3ab2 + b3

(a - b)3 = a3 - 3a2b + 3ab2 - b3

Product of binomial and trinomial

(a + b)(a2 – ab – b2) = a3 + b3

(a - b)(a2 + ab + b2) = a3 - b3