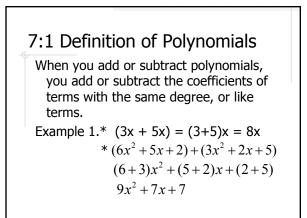


7.1 Definition of Polynomials

Polynomial – a monomial $3x^2y$ or a sum of monomials. The
monomials are called the *terms*of the polynomial.**Similar monomials** –
(aka: like terms) are identical
in their variables and degree,
only different in coefficients.



7:1 Definition of Polynomials

Example 2:* (x+7) - (3x+2)x + 7 - 3x - 2 = (1-3)x + (7-2)-2x - 5

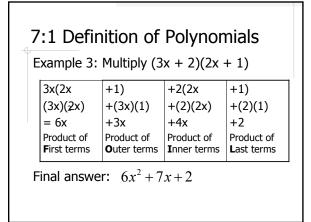
*
$$(-6x^{2} + 10x - 3) - (4x^{2} - 7x)$$

 $(-6 + 4)x^{2} + (10 - 7)x - 3$
 $-10x^{2} + 3x - 3$

7:1 Definition of Polynomials

To multiply two binomials (polynomials with two terms) mentally...FOIL method.

The FOIL method is an acronym to help you remember to multiply two binomials by including each term. The letters of FOIL represent "First - Outside - Inside - Last", or the order in which to multiply using the distributive property. Let's see an example of what this involves:



7:1 Definition of Polynomials

To multiply two polynomials that have more than two terms, multiply each term of one polynomial with each term of the other polynomial. You may multiply vertically or horizontally. See the example below:

7:1 Definition of Polynomials

Example 4: Multiply (3x + 2) with (2x + 1). Vertical format 3x + 2 $\frac{2x + 1}{3x + 2}$ 1(3x + 2) $6x^2 + 4x$ 2x(3x + 2) $6x^2 + 7x + 2$ Product simplified Horizontal format (3x + 2)(2x + 1) = 3x(2x + 1) + 2(2x + 1) $= 6x^2 + 4x + 3x + 2 = 6x^2 + 7x + 2$ Final product

7:1 Definition of Polynomials

Let's review some special products. It may be helpful to just memorize the special products as it will save time since you don't see them frequently

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

Special Products Binomial Squares - $(a+b)^2 = a^2 + 2ab + b^2$ $(a-b)^2 = a^2 - 2ab + b^2$ Difference of Squares - $(a+b)(a-b) = a^2 - b^2$ Binomial Cubes - $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

7:3 Graphs of Polynomial Functions

A polynomial function looks like this... $f(x) = 3x^3 + 2x^2 + x + 1$ The coefficients are not equal to zero.We have discussed how to graph polynomials of
degree 0, 1, and 2.functiondegreegraphf(x) = 30horizontal linef(x)=2x+11straight line

2

parabola

 $f(x) = 2x^2 + 3x + 1$

7:3 Graphs of Polynomial Functions

Other graphs of degree greater than 2 are more of a challenge to graph, but you can learn to recognize the shapes of these functions. Generally pointplotting is the most accurate way to graph these higher degree functions.

7:3 Graphs of Polynomial Functions

Points to remember about graphs of polynomial functions

- The graph of a polynomial of degree n, may cross the x-axis at most n times.
- The curves of a polynomial function are usually smooth and continuous.
- If the leading coefficient of the function is greater than zero, the graph will rise to the right, otherwise, when the coefficient is less than zero, the graph will fall to the right.