5.4 Polynomials in Several Variables

Example 5.4.1
Evaluate the following for $x = -1$ and $y = 5$.

$$3x^3y + xy^2 + 5y + 6$$

Definition 5.4.1 (Degree)
The degree of a monomial in several variables is the sum of the exponents. The degree of a polynomial in several variables is the largest degree of each term.

Example 5.4.2
Find the degree of each term and then find the degree of the polynomial.

$$8x^4y^5 - 7x^3y^2 - x^2y - 6x + 11$$

Definition 5.4.2 (Like Terms)
Two monomials are like terms if the exponent of each variable in one term matches the corresponding exponent in the other term.

Example 5.4.3
Find the following:

$$(-8x^2y - 3xy + 6) + (10x^2y + 5xy - 10)$$

Example 5.4.4
Find the following:

$$(7x^3 - 10x^2y + 2xy^2 - 5) - (4x^3 - 12x^2y - 3xy^2 + 5)$$

Example 5.4.5
Find the following:

$$(6xy^3)(10x^4y^2)$$

Example 5.4.6
Find the following:

$$6xy^2(10x^4y^5 - 2x^2y + 3)$$

Example 5.4.7
Find the following:

$$(7x - 6y)(3x - y)$$

Example 5.4.8
Find the following:

$$(2x + 4y)^2$$

Example 5.4.9
Find the following:

$$(6xy^2 + 5x)(6xy^2 - 5x)$$

Example 5.4.10
Find the following:

$$(x - y)(x^2 + xy + y^2)$$