

Polynomials - Adding, Subtracting and Multiplying

Polynomials - An expression of the form $a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x^1 + a_0$.

$$2x^5 - 3x^2 + 1$$

$$-\frac{2}{3}x^4 + 3x^3 + x^2 - x + 7$$

Coefficient - The number in front of the variable.

Degree - The highest exponent in a polynomial.

Standard Form - A polynomial written with descending powers of x .

$$-6x^2 + 4x^3 + 1$$

Degree = 3
 $4x^3 - 6x^2 + 1$

$$8 + \frac{1}{2}x^6$$

Degree = 6
 $\frac{1}{2}x^6 + 8$

$$7$$

Degree = 0
 7

Monomial - A polynomial with one term.

$$7x^2y$$

Binomial - A polynomial with two terms.

$$6 - x^7$$

Trinomial - A polynomial with three terms.

$$2x^5 - 3x^2 + 1$$

Like Terms - Terms with the same variable and exponents.

$$5x^4, -7x^4$$

$$\frac{1}{2}x^2y, x^2y$$

$$8, -6$$

Adding and Subtracting Polynomials - Combine the like terms. Add or subtract the coefficients.

Directions: Perform the operation and write the answer in standard form.

$$1. \quad \underline{(3x^2+4)} + \underline{(8x^2-1)} = \underline{3x^2} + 4 + \underline{8x^2} - 1 = \boxed{11x^2+3}$$

$$2. \quad \underline{(6x^3+4x-7)} + \underline{(-8x+6)} = 6x^3 + \underline{4x} - 7 + \underline{-8x} + 6 \\ = \boxed{6x^3-4x-1}$$

$$3. \quad \underline{(-15x^2-4)} - \underline{(3x^2+2)} = \underline{-15x^2} - 4 - \underline{3x^2} - 2 \\ = \boxed{-18x^2-6}$$

$$4. \left(\frac{1}{4}x^2 + 1\right) - [(x^2 + 1) - (3x^2 + 7)]$$

$$\left[\underline{x^2 + 1} - \underline{3x^2 - 7} \right]$$

$$\left(\frac{1}{4}x^2 + 1\right) - [-2x^2 - 6]$$

$$\underline{\frac{1}{4}x^2 + 1} + \underline{2x^2 + 6}$$

$$\boxed{\frac{9}{4}x^2 + 7}$$

$$5. \text{ Subtract } x-3 \text{ from } 5x^2-3x+4.$$

$$(5x^2 - 3x + 4) - (x - 3)$$

$$5x^2 - \underline{3x} + 4 - \underline{1x} + 3$$

$$= \boxed{5x^2 - 4x + 7}$$

Multiplying Polynomials - Use the Distributive Property. Add the exponents.

Directions: Perform the operation and write the answer in standard form.

6. $3x(x^2 - 5x + 4)$

$$\boxed{3x^3 - 15x^2 + 12x}$$

7. $-4x^2(6 - x^7)$

$$-24x^2 + 4x^9$$
$$= \boxed{4x^9 - 24x^2}$$

8. $-2xy\left(\frac{1}{4}x^3y + 8x\right)$ $-2 \cdot \frac{1}{4} = -\frac{1}{2}$

$$\boxed{-\frac{1}{2}x^4y^2 - 16x^2y}$$

9. $5x(x+1) - 2x(x-2)$

$$5x^2 + 5x - 2x^2 + 4x$$
$$= \boxed{3x^2 + 9x}$$

10. $(x+5)(2x+1)$

$$2x^2 + 1x + 10x + 5$$
$$= \quad =$$
$$\boxed{2x^2 + 11x + 5}$$

FOIL
F U N A
I + N S
L C E S
+ r e +

$$11. \overbrace{(8x+7)}^F \underbrace{(8x-7)}_L$$

FØL

$$\boxed{64x^2 - 49}$$

$$12. (4x-9)^2 = \overbrace{(4x-9)}^F \underbrace{(4x-9)}_L$$

$$16x^2 - \underline{36x} - \underline{36x} + 81$$

$$\boxed{16x^2 - 72x + 81}$$

$$13. \overbrace{(3x+2y)}^F \underbrace{(2x-3y)}_L$$

$$6x^2 - \underline{9xy} + \underline{4xy} - 6y^2$$

$$\boxed{6x^2 - 5xy - 6y^2}$$

$$14. [(x+2)-y]^2$$

$$[(x+2)-y][(x+2)-y]$$

$$[x+2-y][x+2-y]$$

$$\underline{x^2} + \underline{2x} - \underline{xy} + \underline{2x} + 4 - \underline{xy} - \underline{2y} + y^2$$

$$x^2 + 4x - 2xy - 4y + 4 + y^2$$

$$\boxed{x^2 + y^2 + 4x - 4y - 2xy + 4}$$

15. $(x-3)^3$

$$(x-3)(x-3)(x-3)$$

FOIL

$$x^2 - \underline{3x} - \underline{3x} + 9$$

$$(x^2 - 6x + 9)(x-3)$$

$$x^3 - \underline{3x^2} - \underline{6x^2} + \underline{18x} + \underline{9x} - 27$$

$$\boxed{x^3 - 9x^2 + 27x - 27}$$

16. $(5x^2 + 2x + 1)(2x - 3) =$

$$(2x-3)(5x^2+2x+1)$$

$$10x^3 + 4x^2 + 2x$$

$$-15x^2 - 6x - 3$$

$$\boxed{10x^3 - 11x^2 - 4x - 3}$$

17. $(x+y)(x-y)(x^2+y^2)$

F O I L

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

$$\boxed{x^4 - y^4}$$