

Example 1:

Add the following two polynomials

$$5x^3+3x^2+2x+1 \text{ and } 6x^2+3x+2$$

Solution:

Given

$$5x^3+3x^2+2x+1 \text{ and } 6x^2+3x+2$$

$$\text{Addition of two polynomials} = (5x^3+3x^2+2x+1) + (6x^2+3x+2)$$

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

$$6x^2+3x+2 \quad (+)$$

$$= 5x^3+9x^2+5x+3$$

Add the equal exponential variables

$$= 5x^3+9x^2+5x+3$$

Example 2:

Subtract the following two polynomials

$$7x^3+4x^2+3x+1 \text{ and } 2x^3+2x^2+x+1$$

Solution:

Given

$$7x^3+4x^2+3x+1 \text{ and } 2x^3+2x^2+x+1$$

$$\text{Solving subtraction of two polynomials} = 7x^3+4x^2+3x+1 - (2x^3+2x^2+x+1)$$

Step 1:

Find the opposite polynomial of the subtracted term

$$\text{Opposite of } (2x^3+2x^2+x+1) \text{ subtracted polynomial} = -2x^3-2x^2-x-1$$

Step 2:

Add the polynomials

$$\text{Addition} = (7x^3 + 4x^2 + 3x + 1) - (2x^3 + 2x^2 + x + 1)$$

$$= 7x^3 + 4x^2 + 3x + 1$$

$$- 2x^3 - 2x^2 - x - 1 \quad (+)$$

$$5x^3 + 2x^2 + 2x + 0$$

Add the equal exponential variables

$$= 5x^3 + 2x^2 + 2x + 0$$

$$= 5x^3 + 2x^2 + 2x$$

Example 3:

Multiply the following two polynomials

$$6x^2 + 5xy + 4y^2 + 2x + 6y \text{ and } 5x + 3y$$

Solution:

Given

$$6x^2 + 5xy + 4y^2 + 2x + 6y \text{ and } 5x + 3y$$

$$\text{Solving multiplication of two polynomials} = (6x^2 + 5xy + 4y^2 + 2x + 6y) * (5x + 3y)$$

$$= 30x^3 + 18x^2y + 25x^2y + 15xy^2 + 20xy^2 + 12y^3 + 10x^2 + 6xy + 30xy + 18y^2$$

Add the equal exponential variables.

$$= 30x^3 + 43x^2y + 35x^2y + 12y^3 + 10x^2 + 36xy + 18y^2$$