Programming

To write my program I used CLISP.

The form of my input polynomials is:
(("x" (2 0 0) 2)+("y"(0 2 0) 3)) = $2x^2 + 3y^2$
(("x" (2 0 0) 2)*("y"(0 2 0) 3)) = $6x^2y^3$
(("x" 2 2)-("x"2 1)) = x^2

In the " " is the variables e.g x, y or z.
The second part (2 0 0) is the exponents is in the order of x,y,z.
The final part is the coefficient

Poly+

Input: '(("x" (3 0 0) 24) ("x" (1 0 0) 12) ("x" (3 0 0) 12) ("x" (2 0 0) 12))
'(("0" (0 0 0) 6) ("x" (2 0 0) 6))

Output: (("0" (0 0 0) 6) ("x" (2 0 0) 18) ("x" (1 0 0) 12) ("x" (3 0 0) 36))

Input: '(("x" (3 0 0) 24) ("x" (1 0 0) 12))
'(("y" (0 2 0) 24) ("x" (1 0 0) 12))

Output: (("y" (0 2 0) 24) ("x" (1 0 0) 24) ("x" (3 0 0) 24))

Input: '(("xy" (3 1 0) 24) ("x" (1 0 0) 12) ("xy" (3 1 0) 12))
'(("x" (2 0 0) 12) ("0" (0 0 0) 6) ("x" (2 0 0) 6))

Output: (("0" (0 0 0) 6) ("x" (2 0 0) 18) ("x" (1 0 0) 12) ("xy" (3 1 0) 36))

Poly-

Input: '(("x" 2 1)("x" 2 3)("0" 0 3))
'(("x" 2 4)("x" 2 5)("0" 0 1))

Output: (("0" 0 2) ("x" 2 -5))

Input: '(("x" 2 1)("xy" 2 3)("0" 0 3))
'(("xy" 2 4)("x" 2 5)("0" 0 1))

Output: (("0" 0 2) ("xy" 2 -1) ("x" 2 -4))

Input: '(("x" 2 1)("xy" 2 3))
'(("xy" 2 4)("x" 2 5)("0" 0 1))

Output: (("0" 0 -1) ("xy" 2 -1) ("x" 2 -4))

Poly*

Within this function I was not able to create a function which concatenated strings together therefore the strings are not printed correctly with in my answer but the printed exponents are correct and they show if x, y or z are present in the answer. I have printed the strings with in my answers but some maybe incorrect.

Input: '(("x" (1 0 0) 2)("x" (1 0 0) 4))
'(("y" (0 2 0) 6)("0" (0 0 0) 3)("x" (2 0 0) 3))

Output: (("x" (3 0 0) 18) ("x" (1 0 0) 18) ("x" (1 2 0) 36))

Input: '(("x" (1 0 0) -2)("xyz" (1 2 5) 4))
'(("xyz" (1 2 3) 6)("0" (0 0 0) 3)("x" (2 0 0) 3))

Output: (("x" (3 0 0) -6) ("x" (1 0 0) -6) ("x" (2 2 3) -12) ("xyz" (3 2 5) 12)
("xyz" (1 2 5) 12) ("xyz" (2 4 8) 24))

Input: '(("x" (1 0 0) -2)("xy" (1 2 0) 4))
'(("xy" (1 2 0) 6)("0" (0 0 0) 3)("x" (2 0 0) 3))

Output: (("x" (3 0 0) -6) ("x" (1 0 0) -6) ("x" (2 2 0) -12) ("xy" (3 2 0) 12)
("xy" (1 2 0) 12) ("xy" (2 4 0) 24))