Generating functions for the number of 4xn binary matrices with k=0,1,...,10 unit columns, up to row and column permutation

1/24*(1/(1-x^1)^12+6/(1-x^1)^6/(1-x^2)^3+3/(1-x^1)^4/(1-x^2)^4+8/(1-x^1)^3/(1-x^3)^3+6/(1-x^1)^2/(1-x^2)^1/(1-x^4)^2)

x/24*(4/(1-x^1)^12+12/(1-x^1)^6/(1-x^2)^3+8/(1-x^1)^3/(1-x^3)^3)

x^2/24*(10/(1-x^1)^12+24/(1-x^1)^6/(1-x^2)^3+6/(1-x^1)^4/(1-x^2)^4+8/(1-x^1)^3/(1-x^3)^3)

x^3/24*(20/(1-x^1)^12+36/(1-x^1)^6/(1-x^2)^3+16/(1-x^1)^3/(1-x^3)^3)

x^4/24*(35/(1-x^1)^12+54/(1-x^1)^6/(1-x^2)^3+9/(1-x^1)^4/(1-x^2)^4+16/(1-x^1)^3/(1-x^3)^3+6/(1-x^1)^2/(1-x^2)^1/(1-x^4)^2)

x^5/24*(56/(1-x^1)^12+72/(1-x^1)^6/(1-x^2)^3+16/(1-x^1)^3/(1-x^3)^3)

x^6/24*(84/(1-x^1)^12+96/(1-x^1)^6/(1-x^2)^3+12/(1-x^1)^4/(1-x^2)^4+24/(1-x^1)^3/(1-x^3)^3)

x^7/24*(120/(1-x^1)^12+120/(1-x^1)^6/(1-x^2)^3+24/(1-x^1)^3/(1-x^3)^3)

x^8/24*(165/(1-x^1)^12+150/(1-x^1)^6/(1-x^2)^3+15/(1-x^1)^4/(1-x^2)^4+24/(1-x^1)^3/(1-x^3)^3+6/(1-x^1)^2/(1-x^2)^1/(1-x^4)^2)

x^9/24*(220/(1-x^1)^12+180/(1-x^1)^6/(1-x^2)^3+32/(1-x^1)^3/(1-x^3)^3)

x^10/24*(286/(1-x^1)^12+216/(1-x^1)^6/(1-x^2)^3+18/(1-x^1)^4/(1-x^2)^4+32/(1-x^1)^3/(1-x^3)^3)