Discrete Mathematics
Problem Set 11

5. Four kinds of jelly beans, Red, Green, White, Black

In how many ways can we select 24 jelly beans so that we have an even number of white beans and at least six black ones? Set up a generating function and use it to find a solution.

Discrete Mathematics
Problem Set 11

5. Four kinds of jelly beans, Red, Green, White, Black; Assume there are unlimited number (or at least 24 of each color) of Red, Green, White, and Black jelly beans.

In how many ways can we select 24 jelly beans so that we have an even number of white beans and at least six black ones? Set up a generating function and use it to find a solution.

Red (green): $1 + x^1 + x^2 + \dots + x^{23} + x^{24}$

White: $1 + x^2 + x^4 + \dots + x^{22} + x^{24}$

Black: $x^6 + x^7 + \dots + x^{23} + x^{24}$

$f(x) = (1 + x^1 + x^2 + \dots + x^{23} + x^{24})(1 + x^2 + x^4 + \dots + x^{22} + x^{24})(x^6 + x^7 + \dots + x^{23} + x^{24})$

The coefficient of x^{24} is the solution.