$f(n) = n^2! \prod_{j=0}^{n-1} \frac{j!}{(j+n)!}$

$f(n+1) = (n+1)^2! \prod_{j=0}^{n} \frac{j!}{((j+n)!(j+n+1))}$

$= (n+1)^2! \frac{n!}{(2n+1)!} \prod_{j=0}^{n} \frac{j!}{(j+n)!}$

$= (n+1)^2! \frac{n!}{(2n+1)!} (\prod_{j=0}^{n-1} \frac{j!}{(j+n)!}) \frac{n!}{2n!}$

$36! \frac{0!1!2!3!4!5!}{6!7!8!9!10!11!}$