PROBABILITY FORMULA CHEAT SHEET

1. Factorial
$n! = n \times (n-1) \times (n-2) \times ... \times 1$

2. Permutation (Order Matters)
$nPr = n! / (n-r)!$
Used when arrangement/order matters.

3. Combination (Order Does NOT Matter)
$nCr = n! / (r!(n-r)!)$
Used when selecting items without caring about order.

4. Probability Distribution Condition
Sum of all probabilities must equal 1.
$\Sigma f(x) = 1$

5. Example (Your Question)
(a) $f(x)=c(x^2+4)$ → sum values then set c×total=1
(b) $f(x)=c*C(2,x)*C(3,3-x)$ → use combination formula

6. Combination Formula Used in Part (b)
$C(n,r)=n!/(r!(n-r)!)$
Examples:
C(2,0)=1, C(2,1)=2, C(2,2)=1
C(3,3)=1, C(3,2)=3, C(3,1)=3

Quick Summary
Permutation → Order matters
Combination → Order does NOT matter
Probability distribution → Total probability = 1