1. At the end of the day, a bakery gives everything that is unsold to food banks for the needy. If it has 12 apple pies left at the end of a given day, in how many different ways can it distribute these pies among six food banks for the needy if each of the six food banks is to receive at least one pie? **You do not have to give explicit numbers for the solution, i.e. you can leave the solution as a product and/or sum of numbers and you do not have to expand out terms with a factorial or binomial coefficients.**

We have to distribute six pies amongst 6 food banks. Let $b_1 \cdots b_5$ denote seperations between banks. Then, we are looking for arrangements of the form

$$p_1 \, p_2 \, p_3 \, p_4 \, p_5 \, p_6 \, b_1 \, b_2 \, b_3 \, b_4 \, b_5$$

$$\Rightarrow \frac{11!}{6! \, 5!}$$

Since order of pies and bars does not matter.