## Answer on Question \#45807 - Math - Combinatorics | Number Theory

## Question.

At a particular receptionist, 9 guests are to stand at 3 identical round cocktail tables. How many ways can this be done if there must be at least 2 people at each table?

## Solution

We choose three of the nine guests. We can do this in $C_{9}^{3}$ ways. Now, make them sit at three tables so that each table had one guest. Since the tables are identical we can do it in $\frac{3 \cdot 2 \cdot 1}{3!}=1$ way. Next we choose three of six guests. We can do this in $C_{6}^{3}$ ways. Make them again one at each of the three tables. Now the order is important so we can do it in $3 \cdot 2 \cdot 1=6$ ways. We can accommodate arbitrarily the remaining three guests in $3 \cdot 3 \cdot 3=27$ ways. We have by the rule of multiplication $C_{9}^{3} \cdot 1 \cdot C_{6}^{3} \cdot 6 \cdot 27=\frac{9!}{3!6!} \cdot \frac{6!}{3!3!} \cdot 6 \cdot 27=272160$ ways.

Answer: 272160 ways.

