1. (10 points) Find a closed formula (no summation signs) for the expression $c(n, n - 2)$.

**Solution:** The solution of this problem is similar to the solution of the problem for $S(n, n - 2)$. Note that there are two types of permutations with $n - 2$ cycles.

1. The first type consists of permutations with one cycle of length 3 and $n - 3$ cycles of length 1. Note that there are \( \binom{n}{3} \) ways to choose elements of the cycle of length 3 and there are 2 ways to form a cycle from these elements. Hence, there are $2 \cdot \binom{n}{3}$ permutations of this type.

2. The second type consists of permutations with two cycles of length 2 and $n - 4$ cycles of length 1. Note that there are \( \binom{n}{2} \) ways to select elements of the first cycle and \( \binom{n-2}{2} \) ways to select the second cycle. Hence, there are \( \frac{\binom{n}{2} \cdot \binom{n-2}{2}}{2} \) permutations of this type (we divide by 2 since we may reorder the cycles).

As a result, the final answer is $2 \cdot \binom{n}{3} + \frac{\binom{n}{2} \cdot \binom{n-2}{2}}{2}$. 