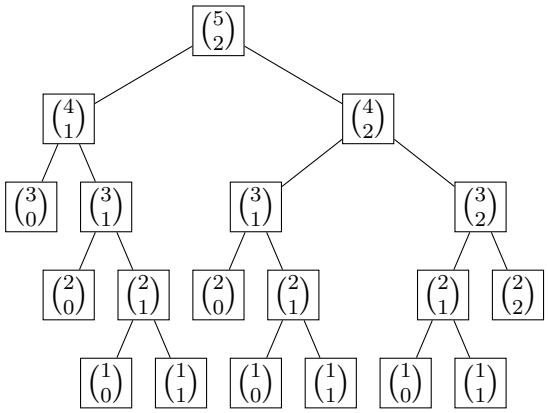
Binomial Coefficient Worksheet

Draw the recursion tree for computing $\binom{5}{2}$ based on the Pascal recurrence and answer the questions below.



1. Use the tree to determine how many calls would a recursive algorithm make to compute $\binom{5}{2}$.

   19 recursive calls

2. Can you deduce from this a closed formula to determine the number of calls to compute $\binom{n}{k}$.

   Because the number of internal nodes is always one less than the number of leaves, which is equal to $\binom{n}{k}$, we can write the formula as follows:

$$\binom{n}{k} + \binom{n}{k} - 1$$
$$2\binom{n}{k} - 1$$