HOMEWORK 1

Chapter 1-1: #1, 3, 5, 7, 8, 11, 13, 14.
Chapter 2-2: #1(a and c).

CHALLENGE PROBLEM: Let \( \binom{n}{k} \) be the choose function, defined by
\[
\binom{n}{k} = \frac{n!}{(n-k)!k!},
\]
where
\[
\binom{n}{n} = \binom{n}{0} = 1.
\]
Prove that for \( 1 \leq k \leq n-1 \),
\[
\binom{n}{k} = \binom{n-1}{k-1} + \binom{n-1}{k}.
\]
Use this to prove that the product of any \( k \) consecutive integers is divisible by \( k! \).