Problem 16) The binomial expansion of $(x+1)^n$ is given by

$$(x+1)^n = \sum_{k=0}^{n} \binom{n}{k} x^k.$$

Differentiation with respect to x yields

$$n(x+1)^{n-1} = \sum_{k=0}^{n} k \binom{n}{k} x^{k-1}.$$

Setting $x = 1$, and noting that the term corresponding to $k = 0$ is zero, we find

$$\sum_{k=1}^{n} k \binom{n}{k} = n2^{n-1}.$$