45. Let $X_1, X_2, ..., X_n$ be independent Bernoulli(p), and define Y $= \Sigma_{i=1}^{n} X_i$. Use these facts to prove the following

(a) $\mathrm{Var}(Y) = np(1-p)$. Hint: For independent random variables, the variance of a sum is the sum of the variances.

(b) $M_Y(t) = (1-p+pe^t)^n$. Hint: If W_1 and W_2 are independent random variables $\mathrm{E}[W_1W_2] = \mathrm{E}[W_1]\mathrm{E}[W_2]$. This is generalizable to n mutually exclusive random variables.