a)

$$\sum_{k=0}^{n} \binom{n}{k} p^{k}(1-p)^{n-k} \overset{\substack{\text{dwumian} \\ \text{Newtona}}}{=} \left(p+(1-p)\right)^{n} = 1$$

b)

$$\sum_{k=0}^{n} k \binom{n}{k} p^{k}(1-p)^{n-k} = \sum_{k=0}^{n} \cancel{k} \frac{n!}{(n-k)!\,\underset{(k-1)!}{\cancel{k!}}} p^{k}(1-p)^{n-k} = \sum_{k=-1}^{n-1} \Bigg(\underbrace{\frac{n!}{(n-1-k)!\,k!}}_{\binom{n-1}{k}} p^{k+1}(1-p)^{n-1-k} \Bigg) = np \cdot \sum_{k=-1}^{n-1} \binom{n-1}{k} p^{k}(1-p)^{(n-1)-k} = np \underbrace{\boxed{\sum_{k=0}^{n-1} \binom{n-1}{k} p^{k}(1-p)^{(n-1)-k}}}_{=1} = np$$

$\sum$ dla $k=-1$ to zero