Research can start

$$p(X=k)=\binom{n}{k}p^k q^{n-k} \quad k\in\{0,1,2,\dots,n\}$$

$$E(X)=\sum_{k=0}^{n}k\times p(X=k)=\sum_{k=0}^{n}k\times\binom{n}{k}p^k q^{n-k}$$

$$=\sum_{k=0}^{n}k\times\frac{n!}{(n-k)!\,k!}p^k q^{n-k}=\sum_{k=1}^{n}k\times\frac{n!}{(n-k)!\,k!}p^k q^{n-k}$$

$$=\sum_{k=1}^{n}\frac{n(n-1)!}{(n-k)!\,(k-1)!}p^k q^{n-k}=np\sum_{k=1}^{n}\frac{(n-1)!}{(n-k)!\,(k-1)!}p^{k-1}q^{n-k}$$

$$=np\sum_{k=1}^{n}\binom{n-1}{k-1}p^{k-1}q^{n-k}=np{}_{i=0}^{n-1}\binom{n-1}{i}p^i q^{n-(i+1)}$$

$$=np\sum_{i=0}^{n-1}\binom{n-1}{i}p^i q^{(n-1)-i}\underline{\underline{=np\times 1=np}}$$