0.1 Question

Show $\sum_{k=1}^{n} k^3 = \frac{n^2(n+1)^2}{4}$ by answering the following questions:

1. Calculate $k^4 - (k-1)^4$
2. Sum both sides from $k = 1$ to $k = n$
3. Then use telescoping and the formulas $\sum_{k=1}^{n} k = \frac{n^2+n}{2}$ and $\sum_{k=1}^{n} k^2 = \frac{1}{6}n(n+1)(2n+1)$

0.2 Question

Let $\boldsymbol{A}, \boldsymbol{B}$ be $n \times n$ matrix. Prove that $(\boldsymbol{AB})^T = \boldsymbol{B}^T\boldsymbol{A}^T$.