QUESTION:

∇^p(ao+a1*t+...an*t^p)=p!*an prove left hand side.. and note that a0,a1...an 0,1..n is in the

subscript of a and ^p means power and * means multiply.

SOLUTION:

$\nabla^p(a_0 + a_1 t + a_2 t^2 + ... + a_n t^p) = \nabla^p(a_0) + \nabla^p(a_1 t) + ... + \nabla^p(a_n t^p) = a_n \nabla^p(t^p)$

(since $\nabla^p(a_0) = 0$, $\nabla^p(a_1 t) = 0$, ..., $\nabla^p(a_{n-1} t^{p-1}) = 0$. Hence

$a_n \nabla^p(t^p) = a_n \cdot p \cdot \nabla^{p-1}(t^{p-1}) = a_n \cdot p \cdot (p-1)\nabla^{p-2}(t^{p-2}) = ... = a_n \cdot p(p-1)(p-2)(p-3)....1 = a_n p!$