Let V be a C-space of all complex valued polynomials with an inner product

$$\langle p, q \rangle = \int_0^1 p(t)\overline{q(t)}\, dt.$$

(i) Let *p* be a polynomial and let Mp: V-> V be a linear operator that is given by $M_p(q) := p \cdot q$. Show that operator Mp has an adjoint and find it.

(ii) Let D: V-> V be a linear operator that maps every polynomial in its derivative , by other words $D(p) = p'$. Show that D has not an adjoint.