(5.) Solve the boundary value problems

(i) $\frac{dE}{dx} = \delta(x-1), \quad E(0)=0$

(ii) $\frac{d^2E}{dx^2} = \delta(x-1)+\delta'(x-1), \quad E'(0)=0, \quad E(0)=0$

(iii) $x\,\frac{d^2}{dx^2}(xE) = \delta(x), \quad E(\pm\infty)=0.$

(6) Show that $y = f(x)\bar{x}^k + \sum_{j=1}^{k} c_j\,\delta^{(j-1)}(x)$

is a solution of the algebraic Generalized function equation $x^k y = f(x)$.

$x\delta^{(n)}(x) = 0 \quad (>0$