$\frac{8}{a}$ IF L_n IS ORTHOGONAL TO L_{n+1}

THEN, $\langle L_n \cdot L_{n+1} \rangle = \emptyset$

$$\longrightarrow \int_0^\infty L_0\, L_1\, e^{-x}\, dx = \int_0^\infty 1 \cdot (1-x)\, e^{-x}\, dx$$

$$= \int_0^\infty (e^{-x} - xe^{-x})\, dx = \int_0^\infty e^{-x} dx - \int_0^\infty x e^{-x}\, dx$$

$$= 1 - 1$$

$$= \emptyset \longrightarrow L_0 \,\&\, L_1$$

ARE ORTHOGONAL