8b $\langle L_0, L_2 \rangle = \displaystyle\int_0^\infty (x^2 - 4x + 2)\, e^{-x}\, dx$

$$= \lim_{b\to\infty} \underbrace{\int_0^b x^2 e^{-x}\, dx}_{\alpha} - \underbrace{4\int_0^b x e^{-x}\, dx}_{\beta} + \underbrace{2\int_0^b e^{-x}\, dx}_{\Gamma}$$

$\left\{ \begin{matrix} u = x^2 & dv = e^{-x}dx \\ du = 2x\,dx & v = -e^{-x} \end{matrix} \right\} \rightarrow \alpha = -x^2 e^{-x} \Big|_0^b + 2\displaystyle\int_0^b x e^{-x}\, dx = \cdots$

$\left\{ \begin{matrix} u = x & dv = e^{-x}dx \\ du = dx & v = -e^{-x} \end{matrix} \right\}$

$$2\left[-x e^{-x} \Big|_0^b + \int_0^b e^{-x}\, dx \right]$$

$$2\left[-be^{-b} - e^{-x} \Big|_0^b \right]$$

$$2\left[-be^{-b} - e^{-b} + 1 \right]$$

$\cdots = -b^2 e^{-b} + 2\left[-be^{-b} - e^{-b} + 1 \right]$

$\displaystyle\lim_{b\to\infty} \alpha = 0 + 2[0 + 0 + 1] = 2$

$\left\{ \displaystyle\lim_{b\to\infty} \frac{-b^2}{e^b} \underset{\text{RULE}}{\overset{\text{LH's}}{=}} \lim_{b\to\infty} \frac{-2b}{e^b} \underset{\text{RULE}}{\overset{\text{LH's}}{=}} \lim_{b\to\infty} \frac{-2}{e^b} = 0 \right\}$

29TH ANNE, 1:00 PM

WATCH 4 CLAIMS (MED)