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

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

α: $\{u = x^2,\ dv = e^{-x}dx;\ du = 2x\,dx,\ v = -e^{-x}\}$ $\to \alpha = -x^2e^{-x}\Big|_0^b + 2\int_0^b xe^{-x}\,dx = \cdots$

$\{u = x,\ dv = e^{-x}dx;\ du = dx,\ v = -e^{-x}\}$

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

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

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

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

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

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

29TH ANNE, 1:00 PM

WATCH 4 CLAIMS (M