Problem 135

$N|\lambda \sim \text{Poisson}(\lambda)$

$E(N|\lambda) = V(N|\lambda) = \lambda$

$\lambda \sim \text{Uniform}[0, 3]$

$E(\lambda) = \frac{0+3}{2} = \frac{3}{2}$

$V(\lambda) = \frac{(3-0)^2}{12} = \frac{3}{4}$

$V(N) = V(E[N|\lambda]) + E(V[N|\lambda])$

$= V(\lambda) + E(\lambda)$

$= \frac{3}{4} + \frac{3}{2} = \frac{9}{4}$

$\boxed{E}$