

54.

Solution: B

Let Y denote the claim payment made by the insurance company.

Then

$$Y = \begin{cases} 0 & \text{with probability } 0.94 \\ \text{Max } (0, x-1) & \text{with probability } 0.04 \\ 14 & \text{with probability } 0.02 \end{cases}$$

and

$$\begin{aligned} E[Y] &= (0.94)(0) + (0.04)(0.5003) \int_1^{15} (x-1)e^{-x/2} dx + (0.02)(14) \\ &= (0.020012) \left[\int_1^{15} xe^{-x/2} dx - \int_1^{15} e^{-x/2} dx \right] + 0.28 \\ &= 0.28 + (0.020012) \left[-2xe^{-x/2} \Big|_1^{15} + 2 \int_1^{15} e^{-x/2} dx - \int_1^{15} e^{-x/2} dx \right] \\ &= 0.28 + (0.020012) \left[-30e^{-7.5} + 2e^{-0.5} + \int_1^{15} e^{-x/2} dx \right] \\ &= 0.28 + (0.020012) \left[-30e^{-7.5} + 2e^{-0.5} - 2e^{-x/2} \Big|_1^{15} \right] \\ &= 0.28 + (0.020012) \left(-30e^{-7.5} + 2e^{-0.5} - 2e^{-7.5} + 2e^{-0.5} \right) \\ &= 0.28 + (0.020012) \left(-32e^{-7.5} + 4e^{-0.5} \right) \\ &= 0.28 + (0.020012)(2.408) \\ &= 0.328 \quad (\text{in thousands}) \end{aligned}$$

It follows that the expected claim payment is 328 .