

52. Solution: A

Let us first determine K . Observe that

$$1 = K \left(1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} \right) = K \left(\frac{60 + 30 + 20 + 15 + 12}{60} \right) = K \left(\frac{137}{60} \right)$$

$$K = \frac{60}{137}$$

It then follows that

$$\begin{aligned} \Pr[N = n] &= \Pr[N = n | \text{Insured Suffers a Loss}] \Pr[\text{Insured Suffers a Loss}] \\ &= \frac{60}{137N} (0.05) = \frac{3}{137N}, \quad N = 1, \dots, 5 \end{aligned}$$

Now because of the deductible of 2, the net annual premium $P = E[X]$ where

$$X = \begin{cases} 0 & , \text{ if } N \leq 2 \\ N - 2 & , \text{ if } N > 2 \end{cases}$$

Then,

$$P = E[X] = \sum_{N=3}^5 (N-2) \frac{3}{137N} = (1) \left(\frac{1}{137} \right) + 2 \left[\frac{3}{137(4)} \right] + 3 \left[\frac{3}{137(5)} \right] = 0.0314$$