AxM: Curso SOA P
Tarea 4

Ejercicio 1

Under an insurance policy, a maximum of five claims may be filed per year by a policyholder. Let $p(n)$ be the probability that a policyholder files n claims during a given year, where $n = 0,1,2,3,4,5$. An actuary makes the following observations:

i) $p(n) \geq p(n+1)$ for $n = 0, 1, 2, 3, 4$.
ii) The difference between $p(n)$ and $p(n+1)$ is the same for $n = 0,1,2,3,4$.
iii) Exactly 40% of policyholders file fewer than two claims during a given year.

Calculate the probability that a random policyholder will file more than three claims during a given year.

(A) 0.14
(B) 0.16
(C) 0.27
(D) 0.29
(E) 0.33

Ejercicio 2

A group insurance policy covers the medical claims of the employees of a small company. The value, V, of the claims made in one year is described by

$$V = 100{,}000Y$$

where Y is a random variable with density function

$$f(y) = \begin{cases} k(1-y)^4, & 0 < y < 1 \\ 0, & \text{otherwise} \end{cases}$$

where k is a constant.

Calculate the conditional probability that V exceeds 40,000, given that V exceeds 10,000.

(A) 0.08
(B) 0.13
(C) 0.17
(D) 0.20
(E) 0.51

Ejercicio 3

An insurance company insures a large number of homes. The insured value, X, of a randomly selected home is assumed to follow a distribution with density function

$$f(x) = \begin{cases} 3x^{-4}, & x > 1 \\ 0, & \text{otherwise.} \end{cases}$$

Given that a randomly selected home is insured for at least 1.5, calculate the probability that it is insured for less than 2.

(A) 0.578
(B) 0.684
(C) 0.704
(D) 0.829
(E) 0.875

Ejercicio 4

The lifetime of a machine part has a continuous distribution on the interval (0, 40) with probability density function $f(x)$, where $f(x)$ is proportional to $(10 + x)^{-2}$ on the interval.

Calculate the probability that the lifetime of the machine part is less than 6.

(A) 0.04
(B) 0.15
(C) 0.47
(D) 0.53
(E) 0.94

Ejercicio 5

Individuals purchase both collision and liability insurance on their automobiles. The value of the insured's automobile is V. Assume the loss L on an automobile claim is a random variable with cumulative distribution function

$$F(l)=\begin{cases}\frac{3}{4}\left(\frac{l}{V}\right)^3, & 0\le l<V\\ 1-\frac{1}{10}e^{\frac{-(l-V)}{V}}, & V\le l.\end{cases}$$

Calculate the probability that the loss on a randomly selected claim is greater than the value of the automobile.

(A) 0.00
(B) 0.10
(C) 0.25
(D) 0.75
(E) 0.90

Ejercicio 6

Thirty items are arranged in a 6-by-5 array as shown.

A_1	A_2	A_3	A_4	A_5
A_6	A_7	A_8	A_9	A_{10}
A_{11}	A_{12}	A_{13}	A_{14}	A_{15}
A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
A_{21}	A_{22}	A_{23}	A_{24}	A_{25}
A_{26}	A_{27}	A_{28}	A_{29}	A_{30}

Calculate the number of ways to form a set of three distinct items such that no two of the selected items are in the same row or same column.

(A) 200
(B) 760
(C) 1200
(D) 4560
(E) 7200

Respuestas

1. C
2. B
3. A
4. C
5. B
6. C

Práctica adicional

Ejercicios de la guía gratuita de la SOA para el examen Probability :

23, 32, 113, 119, 179, 297, 340, 341, 353, 375, 381, 392, 409, 420, 426, 477, 579, 585, 600