

3.7) $N_{\text{ex}} = 58$

N	1	3	4	5	6	7	8	9	10	11	12	13
Occurrence	1	2	3	6	9	11	8	8	6	2	1	1

i) $N_{\text{total}} = (7 \cdot 1) + (2 \cdot 3) + (3 \cdot 4) + (5 \cdot 6) + (9 \cdot 8) + (11 \cdot 7) + (8 \cdot 8) + (8 \cdot 9) + (6 \cdot 10) + (2 \cdot 11)$
 $+ 12 + 13$

$N_{\text{total}} = 423$

ii) $\bar{X} = \frac{N}{N_{\text{ex}}} \Rightarrow \bar{X} = \frac{423}{58} \Rightarrow \underline{\underline{\bar{X} = 7.29}}$

iii) $P(N; \bar{N}) = \frac{\exp(-\bar{N}) \bar{N}^N}{N!}, \quad \bar{N} = \bar{x} = 7.29$

$P(N \leq 5) = P(0) + P(1) + P(2) + P(3) + P(4)$

$P(N \leq 5) = 0.00068 + 0.0049 + 0.018 + 0.044 + 0.0803 + 0.12$

$P(N \leq 5) = 0.26788$

esperado = $0.26788 \cdot 58 = \underline{\underline{15.53704}}$

(iv)

$P(N \geq 20) = 1 - P(N \leq 19) \Rightarrow P(N \leq 19) = P(0) + P(1) + \dots + P(19)$

$P(N \leq 19) = 0.9994$

$P(N \geq 20) = 1 - 0.9994 = 0.0006.$

esperado = $0.0006 \cdot 58 = \underline{\underline{0.035}}$