EJERCICIO 2

X = "nº teléfonos móviles"
(v.a. discreta)

· F. Probabilidad:

x	1	2
$f_X(x)$	$\frac{3}{4}$	$\frac{1}{4}$

$\rightarrow \Sigma = 1$

a) $E(X)$ y $Var(X)$

$$E(X) = 1 \cdot \frac{3}{4} + 2 \cdot \frac{1}{4} = \frac{5}{4} =$$

$$= 1'25 \text{ tlfnos.}$$

$$Var(X) = E(X^2) - E^2(X) =$$

$$= 1'75 - 1'25^2 =$$

$$= 0'1875 \text{ tlfnos}^2$$

$$E(X^2) = 1^2 \cdot \frac{3}{4} + 2^2 \cdot \frac{1}{4} =$$

$$= 1'75 \text{ tlfnos}^2.$$

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b) m.a.s. tamaño $n = 3$

b1) b2)

(*)

X_1	X_2	X_3	$\boxed{Prob.}$	$\bar{X}$
1	1	1	27/64	1
1	1	2	9/64	4/3
1	2	1	9/64	4/3
2	1	1	9/64	4/3
1	2	2	3/64	5/3
2	1	2	3/64	5/3
1	2	2	3/64	5/3
2	2	2	1/64	2
			1	

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(✱) $P(X_1 = 1, X_2 = 1, X_3 = 1) =$

$= \frac{3}{4} \cdot \frac{3}{4} \cdot \frac{3}{4} = \frac{27}{64}$

$P(X_1 = 1, X_2 = 1, X_3 = 2) =$

$= \frac{3}{4} \cdot \frac{3}{4} \cdot \frac{1}{4} = \frac{9}{64}$

⋮

$P(X_1 = 2, X_2 = 2, X_3 = 1) =$

$= \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{3}{64} = \frac{3}{64}$

⋮

$P(X_1 = 2, X_2 = 2, X_3 = 1) =$

$= \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{3}{64} = \frac{3}{64}$

⋮

$P(X_1 = 2, X_2 = 2, X_3 = 2) =$

$= \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} = \frac{1}{64}$

b2) F. Prob. de $\bar{x}$

$$\bar{X} = \frac{X_1 + X_2 + X_3}{3} \rightarrow \text{ver b1)}$$

F. Probabilidad :

$\bar{x}$	1	4/3	5/3	2
$f(\bar{x})$	27/64	27/64	9/64	1/64 $\rightarrow \Sigma = 1$
		$\downarrow$ $3 \cdot \frac{9}{64}$	$\downarrow$ $3 \cdot \frac{3}{64}$	

b3) $E(\bar{x})$

$$E(\bar{x}) = 1 \cdot \frac{27}{64} + \frac{4}{3} \cdot \frac{27}{64} + \frac{5}{3} \cdot \frac{27}{64} +$$

$$+ 2 \cdot \frac{1}{64} = 1'25 \text{ u.f.} = E(x)$$

b4) $Var(\bar{x})$

$$Var(\bar{x}) = \boxed{E(\bar{x}^2)} - E^2(\bar{x}) =$$

$$= 1'6250 - 1'25^2 =$$

$$= 0'0625 \text{ tef}^2 \neq Var(x)$$

$$E(\bar{x}^2) = 1^2 \cdot \frac{27}{64} + \left(\frac{4}{3}\right)^2 \cdot \frac{27}{64} + \left(\frac{5}{3}\right)^2 \cdot \frac{9}{64} + 2^2 \cdot \frac{1}{9} =$$

$$= 1'6250 \text{ tefs}^2.$$

NOTA : $Var(\bar{x}) = \dfrac{Var(x)}{n}$

b5) $P(\bar{x} < \mu)$

$$P(\bar{x} < \mu) = P(\bar{x} < 1'25) =$$

$$= P(\bar{x} < 1) = \frac{27}{64}$$

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